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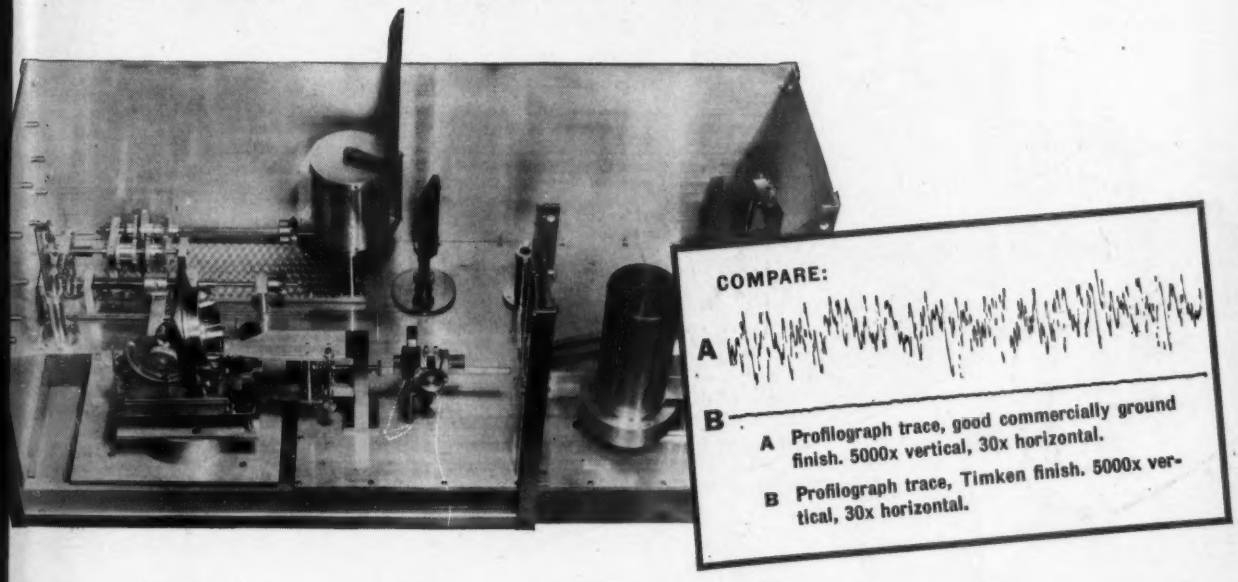
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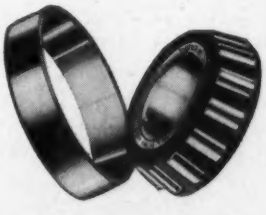

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TAPERED ROLLER BEARINGS

NOT JUST A BALL NOT JUST A ROLLER THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION

PRICE 20 CENTS TABLE OF CONTENTS PAGE 53 AUGUST 16, 1947

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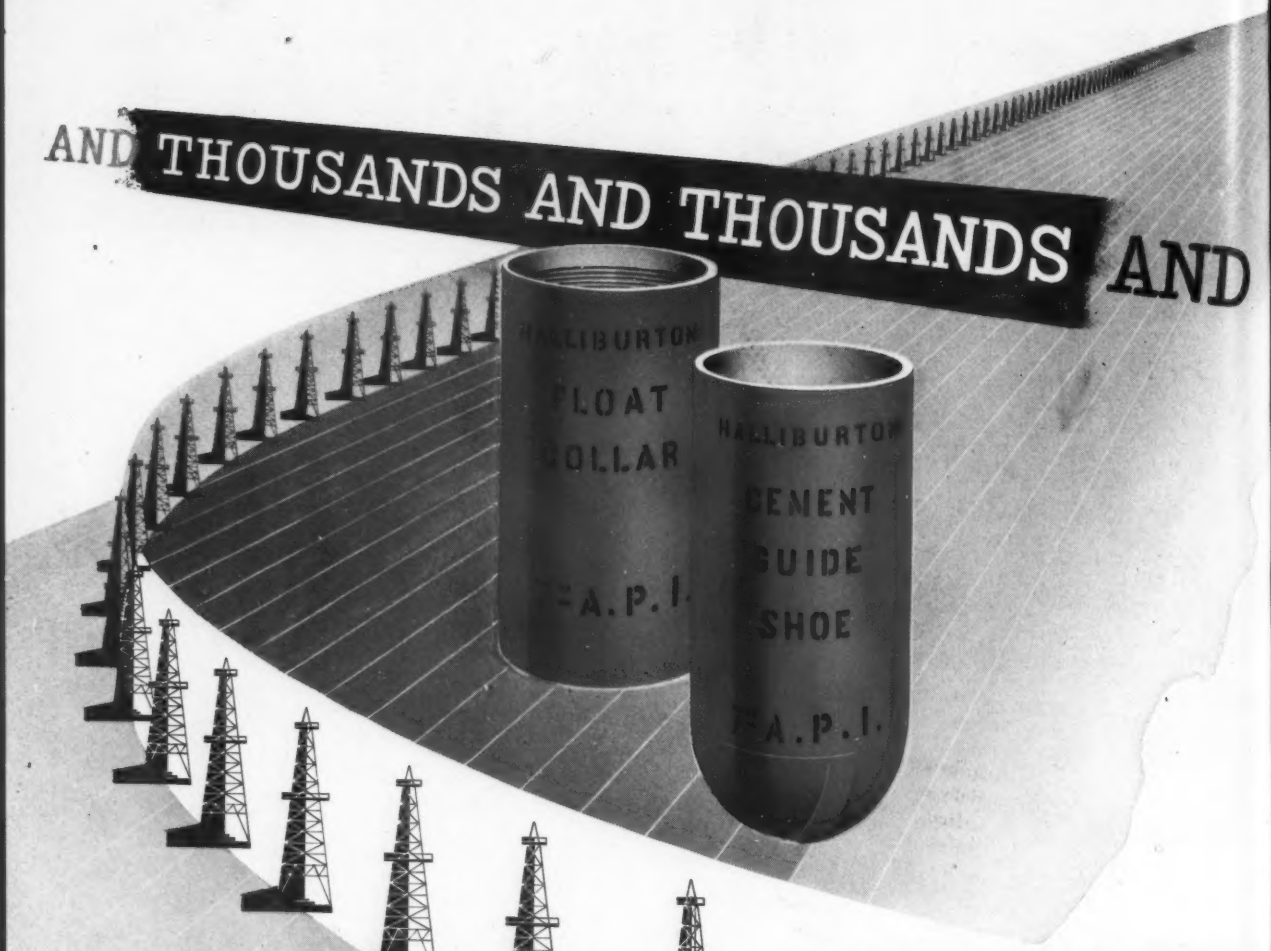

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the OIL AND GAS JOURNAL

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Table of Contents

NEWS DEVELOPMENTS

Records Fall as Industry Moves to Meet Urgent Needs 56
Cooperation Essential, Hallanan Tells Compact 57
Brown Warns Compact Imports May Hamper Conservation .. 57
Climate Major Factor in Alaskan Exploration Work 62
I.P.A.A. President Predicts Oil-Price Rise in 90 Days 66
Sinclair Companies Sign General Wage Increase 66
Oil Industry's Advertising Program Gathering Support 69
New Organization Will Combat Blowouts, Fires 69
Texas Commission Boosts Allowables for August 69
New Brunswick Field Developments Planned 77

Editorial 55
This Week 59
International News 60
Watching Washington 71
Refining News 125
Pipe-Line News 129
Natural-Gas News 133
Natural-Gasoline News 133

ENGINEERING AND OPERATING

Thermal Cracker Expanded Into T.C.C. Unit 78
Design of Low-Pressure Vapor-Conservation Tanks 85
Economics of Cycling 89
Free Pumping Used in Hydraulic Drive 94
Progress in Metals 103
Future of Oil in West Virginia 104
The Refiner's Notebook—No. 157 in a Series 113
Modern Rotary Drilling—No. 33 in a Series 115
Engineering Fundamentals—No. 296 in a Series 117
Oil and Gas Equipment Digest 119

EXPLORATION AND DRILLING

Another Show in Southwest Kansas 137
Reports by Areas Start on Page 137
Weekly Well-Completion Record 156
Daily Average Production for Week 157

ADDITIONAL FEATURES

Personals 75
Deaths in the Industry 77
Drilling Contractors 153
Market Summary 158
Equipment Men in News 161
Classified Advertising 162
Calendar of Events 166
Advertisers' Index 166

Thousands of tests, under all kinds of service conditions, prove that "Dutch Boy" Red Lead gives metal extra protection

4 Ways RED LEAD RESISTS EFFECTS OF WATER

...guards against Rust

Maintenance engineers have long recognized Red Lead as the "standard" metal protective paint. This acceptance is based, to a great extent, on its marked ability to stand up against moisture, a powerful factor in the rusting process.

Now, scientific research into the inherent properties of the pigment itself, shows just how and why Red Lead resists the effects of water. Briefly, there are four reasons:

1. Red Lead resists water "pick-up"—If a series of various metal protective paint films are weighed and then submerged in water (salt or fresh), it is readily noticed, on reweighing after several days immersion, that Red Lead films have outstanding resistance to the absorption, or "pick-up," of water.

***Testing Water Permeability of Paint Films**—With this standard apparatus a measure of the amount of water that passes through a unit of film is obtained.*

Experiments show that a straight linseed oil film allows three times as much water to pass through the film as when the same film is pigmented with Red Lead.

2. Red Lead resists passage of moisture—Rusting of metal will not take place if water does not penetrate the paint film to reach the metal. Water permeability tests of paint films (see illustration at lower left) show, beyond question, that Red Lead is one of the most effective metal protective pigments, because of its stubborn resistance to the passage of moisture through the film.

3. Red Lead resists solution by water—The action of water on paint films results in a partial dissolving of the film. Many metal protective films lose a considerable percentage by weight of their films through solution in water. On the other hand, the solubility losses of Red Lead paint films are practically negligible.

4. Red Lead resists distortion by water—Red Lead films have little tendency to shrivel or change in size during immersion in water. This is imperative to good metal protection. For good protection depends on good adhesion, and a paint film maintains better adhesion when it is not distorted by the action of the water.

Remember, too, Red Lead is compatible with practically all vehicles commonly used in metal protective paints, including many of the fast-drying resin types.

Specify RED LEAD for ALL Metal Protective Paints

The rust-resistant properties of Red Lead are so pronounced that it improves any metal protective paint. So, no matter what price you pay, you'll get a better paint if it contains Red Lead.

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THE OIL AND GAS JOURNAL

Overlapping Taxes

THE petroleum industry has a direct interest in the program approved at the recent Salt Lake City Conference of Governors to end the overlapping of federal and state taxation. The Treasury Department, at least in principle, has also agreed that certain taxation fields should be reserved to the states and others to the federal Government.

Gasoline taxes are a case in point. The state tax started in 1919 and spread rapidly. As long as the tax rates were reasonable and confined to state levies they were not opposed by the petroleum industry. Analyses were made and it was determined that adequate highway construction and maintenance projects could be carried out without the supporting gasoline taxes and motor-vehicle license fees becoming burdensome to the taxpayer.

In some states gasoline taxes are too high and there has been some diversion of funds to nonhighway uses, but in general the original objectives in the disposal of funds have been carried out. The American Petroleum Industries Committee and associated state organizations deserve major credit for the work they have done in preventing state gasoline taxes from getting completely out of hand.

But in 1932 Washington moved in with its initial 1-cent per gallon gasoline tax as a depression revenue measure. The federal tax was to be temporary, but we still have it; and in 1940 it was hiked to 1½ cents, the 50 per cent increase being justified as needed for national defense. The increase was to be discontinued as soon as the emergency ended. But the war has been over for 2 years and there has been no suggestion from the federal tax collectors that they drop a tax that now yields more than 400 million dollars yearly and which since 1932 has brought into the federal treasury 3½ billion dollars.

In the establishment of a line of demarcation between federal and state sources of revenue, gasoline taxes should be confined to the states. State governments are in a better position than any other political unit to administer the funds efficiently.

The contention that the federal tax is needed to provide revenue required to assist states in building national highway systems is more double talk. Federal aid for highways should stand on its own feet and funds should be derived from taxes which properly belong to the federal taxation field. Furthermore, in practice these federal highway funds often have been used as bait which has resulted in wasteful expenditures of state funds.

Heavy taxation in this country is assured for an indefinite period, and the burden must be equitably distributed. The oil industry is the largest taxpayer. Relief for operators and consumers lies in the ending of tax duplications and the fixing of tax boundaries for all governmental divisions.

RECORDS fall by wayside as industry moves to meet urgent needs

THE speeding tempo of the oil industry, moving to meet unprecedented demand for all petroleum products and to prepare for an even greater future demand, was evidenced last week as all-time records fell by the wayside.

This week the industry observed:

A new record for well completions, which reached a total of 781 during the week ended August 9. The figure was one above the all-time high record of 780 set the preceding week and 61 above the previous record of 720 set in the week ended September 25, 1937.

New record crude-oil runs to stills, which during the week ended August 2 reached an average of 5,271,000 bbl. daily, 42,000 bbl. daily above the previous record high of 5,229,000 bbl. daily set during the week ended July 12, according to A.P.I. figures.

New record production of gasoline, with a total output during the week ended August 2 of 16,517,000 bbl., 320,000 bbl. above the previous all-time high of 16,197,000 bbl., also set during the week ended July 12.

A new high level of drilling activity, as figures released by the Interstate Oil Compact Commission showed a record number of 1,909 rotary drilling rigs active in the country as of July 31. The figure was 36 above the highest previous total of 1,873 reached on June 30, 1947, and once before on November 30, 1944.

The well completions included 125 wildcat completions, 12 more than the total of 113 completed during the previous week.

The upward trend of wildcat completions paralleled that of total completions. Together they emphasized the all-out effort being made by the oil industry to meet the current record demand and its unparalleled effort to discover new reserves. The upward trend gave accuracy to the forecast that more than 18,000 wells and more than 68,000,000 ft. of hole will be drilled by the industry during the last half of 1947. (The Oil and Gas Journal, July 26, page 176).

Refining at 93.3 Per Cent

In the refining industry, the runs to stills and record gasoline production represented operations at 93.3 per cent of the nation's total capacity, the same percentage as that of the previous high week of July 12.

Only the Rocky Mountain area showed a drop in runs to stills, falling from 150,000 bbl. daily during the week ended July 26 to 146,000 bbl. Inland Texas runs were unchanged at 234,000 bbl. daily. In all other areas runs were increased.

The Louisiana Gulf Coast, which set the pace in the previous record-breaking week, showed the greatest gain with runs totaling 413,000 bbl., a 14 per cent increase over the 363,000 bbl. run to stills during the previous week. The figure was below the record total of 424,000-bbl. average of the week ending July 12 but remained considerably above its 1946 runs.

The North Louisiana-Arkansas area showed a gain of 6 per cent, and the Illinois - Indiana - Kentucky area was up 3½ per cent. Other areas showed lesser gains.

In spite of the record gasoline production, accompanied by a high rate of crude production, stocks of gasoline continued their seasonal decline, falling to 85,645,000 bbl. on August 2, compared with 85,812,000 bbl. on July 26, 87,145,000 bbl. on July 19, and 87,217,000 bbl. on August 3, 1946.

The Bureau of Mines estimated in its report that August gasoline demand would total 78,000,000 bbl., suggesting it would be provided with a yield of gasoline from crude oil of 42 per cent, based on total crude runs of 5,130,000 bbl. daily.

Citing the record runs to stills, the forecast said: "If runs can be maintained at these high levels for the next few months, the supply of products should meet estimated requirements and provide for the necessary seasonal increase in fuel-oil stocks."

The current situation, it pointed out, is marked by "the early depletion of the winter accumulation of finished gasoline stocks and the continuance of the total demand for all oils at unexpectedly high levels."

The fact that gasoline stocks continue to decline, the report said, indicates the need to raise the gasoline yield. Stocks dropped 4,200,000 bbl. in April, 6,000,000 bbl. in May, and 4,500,000 in June.

In setting the new record for drilling activity, Oklahoma paced the nation with an increase of 30 active rotary rigs over its total of 217 at the end of June.

The new drilling record set in July brought the average monthly figure this year to 1,715, compared with the 1941 figure of about 1,100.

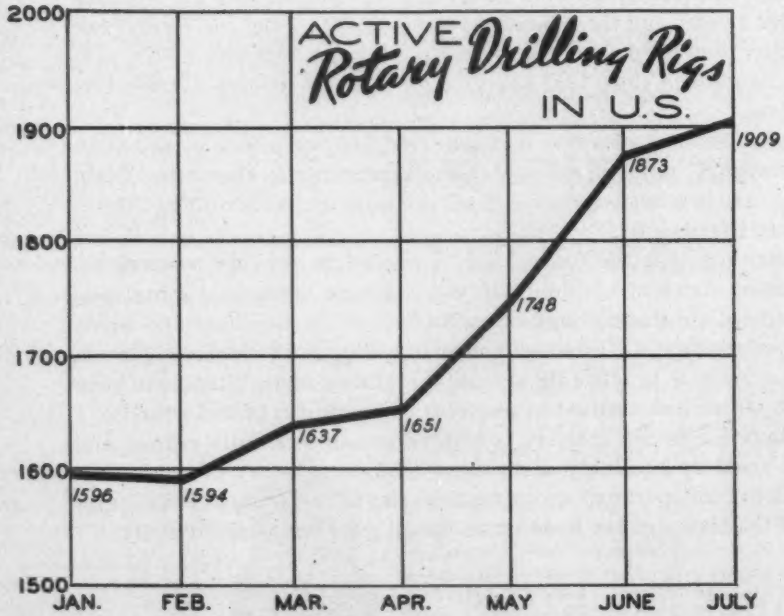


Chart showing upward trend of drilling activity, which established new record during July

TABLE 1—RECENT REFINERY RUNS, GASOLINE PRODUCTION
(Figures in barrels)

Week ending—	Runs to stills (daily ave.)	Gasoline prod. (for week)
May 31	5,000,000	14,709,000
June 7	5,148,000	15,350,000
June 14	5,164,000	15,695,000
June 21	5,078,000	15,682,000
June 28	5,093,000	16,070,000
July 5	5,109,000	15,759,000
July 12	5,229,000	16,197,000
July 19	5,126,000	15,747,000
July 26	5,162,000	16,142,000
August 2	5,271,000	16,517,000

Cooperation With Government Is Essential, Hallanan Tells Compact

GREAT FALLS, Mont.—Failure of the petroleum industry to maintain its "splendid cooperation" with the federal and state governments "would ultimately bring disastrous consequences," Walter S. Hallanan, president of Plymouth Oil Co. and chairman of the National Petroleum Council, declared before the Interstate Oil Compact Commission in its summer quarterly meeting here August 11-13.

"We must not blind ourselves to the fact that we are associated with an industry that has a vital responsibility to the public welfare. The public interest must be served first, but only in a climate of economic freedom," he said. "To pursue any other course," he continued, "would invite the invasion of federal control, which would destroy both the efficiency and the independence of the oil industry."

More than 150 oil men were in Great Falls for the opening of the quarterly meeting.

In the opening session Monday, they heard Warwick M. Downing, Denver, cite the "mounting power" of the commission and attribute it "in large parts to its voluntary nature and to its lack of coercive, governmental authority."

Discussing the 12-year history of the commission, Downing emphasized that the great majority of the recommendations made by the commission have been strictly within its grant of power from Congress to recommend measures for the maximum ultimate recovery of oil and gas, with but very few confined to the sole purpose of preventing physical waste.

The speaker recalled that at the time the compact was created, the oil industry was in a demoralized condition, with a ruinously low crude price. Then, Downing said, many in the industry, and certain governmental agencies led by Secretary Ickes, favored federal control.

Concerning future policy of the commission, the speaker said:

"If the commission is to function successfully as a governmental agency, but without any power other than recommendatory, it must have complete freedom of choice in making such investigations and recommendations as it thinks will accomplish good results for this commission to accomplish its purpose. Its power to investigate and recommend should be broad rather than narrow."

Public Relations

Clarel B. Mapes, general secretary of the Mid-Continent Oil and Gas Association and a member of the operating committee which has had charge of the petroleum industry's public relations plan from its inception, discussed the present status of the program.

Mapes emphasized the necessity of the industry giving full cooperation to the advertising program which got under way this month. The national advertising has a "Tie-In" feature developed by those in charge of the program which enables the industry generally to aid in correcting common public misconceptions regarding the oil industry.

Liquid Fuels from Oil Shales

That production of liquid fuels from oil shale offers great promise, but that such liquid fuels hold no immediate prospect of competing on an equal-cost basis with liquid petroleum was the expressed opinion of R. A. Cattell, chief of the petroleum and natural-gas division and acting chief of the oil shale research and demonstration plant division of the Bureau of Mines.

Notwithstanding this, "few will disagree with the promise that it is time to find out what can be done to supplant our reserves of liquid petroleum, and especially to determine the steps that can be taken if foreign supplies are cut off by an emergency," the speaker said.

Speaking specifically of two oil shale mines now being operated by the Bureau of Mines near Rifle, Colo., Cattell said one is being used for selective production of various types of shale. While the other is being used to demonstrate how shale may be mined at low cost on a scale of 10,000 tons daily.

While efforts so far have been confined largely to production of shale oil, the problem of refining this oil is now being attacked. Construction and design of a plant with a capacity of 200 bbl. of shale oil daily is now being studied, he said.

In addition to listening to speakers at general sessions, time of delegates was taken up by numerous committee meetings and general discussions.

The first half of Monday, opening day of the meeting, was devoted to meetings of commission committees. At noon, members of the press attended a luncheon, presided over by Claude Barrow, oil editor of the Daily Oklahoman, Oklahoma City.

Hiram M. Dow, chairman of the Interstate Oil Compact Commission, who presided at the general sessions of the quarterly meeting

Brown Warns Compact Imports May Hamper Conservation Programs

These remarks are excerpts from an address by Russell B. Brown, general counsel of the Independent Petroleum Association of America, before the Interstate Oil Compact Commission, meeting this week at Great Falls, Mont.

IMPORTS of petroleum have at times injured domestic operations and interfered with the efficient working of conservation programs. It can easily do so again.

There are some who say that the question is an academic one at this time, so why worry? Those who speak so reassuringly cite the record level of oil demand prevailing this year and the relatively tight supply position. It is argued that all available supplies are needed today regardless of whether they come from domestic or foreign sources. To an extent, this is true. Certainly, we are not flooded with over supplies at the moment and our price structure is affected little if any by the pressure

of lower-cost foreign oil at this time. It is natural, therefore, to ask: "Why worry about imports when we need all the oil we can get?"

My own belief is that the question of imports is more important today than at any time in the past 25 years. It is emphasized and highlighted by the fact that at this very moment we are temporarily dependent upon foreign sources for the first time in many decades. We have ceased, for the time, to be a net exporter of petroleum and have become a net importer. More oil is coming into the United States than is going out. Prior to World War II our exports exceeded imports by more than 200,000 bbl. daily. Historically, we have met all of our needs and, in addition, supplied a substantial part of the requirements of other nations. By the reversal of that situation our reserve strength has been weakened.

Nation at "Crossroads"

When I used the expression "temporarily dependent" on imported oil I had in mind the condition which is the result of 4 years of wartime restrictions and subnormal and unprofitable crude-oil prices which prevented normal expansion in our industry. The correction of the condition, I am certain, is largely dependent on the national policy as to imports. Our nation is thus at an important crossroad. There must be a decision whether the domestic industry will be encouraged to grow at the same pace as the demand for petroleum grows, or whether foreign supplies will be allowed—even encouraged—to take a larger and larger share of the market in this country. At the crossroad there is a choice of routes. One is to self-sufficiency and the possession of a satisfactory reserve producing capacity, either of crude oil or synthetics. The other leads to reliance on the reserves of foreign countries—the making permanent of our "temporary dependency."

The domestic oil industry and the state governments, acting through their duly constituted conservation agencies, are fully committed to the principle of production within maximum efficient rates. They are opposed to the storage aboveground of excessive quantities of crude petroleum and products, a practice which contributes quite directly to waste. To carry out these two principles of conservation the market demand for petroleum must be considered. Our unknown factor is the quantity of imports—the quantity that is going to come in. There is now no restriction on such imports as to quantity. Trade agreements have effectively reduced duties on crude oil, fuel oil, and other products except gasoline and there is currently under way a movement by the State Department to reduce the duty on gasoline. To this extent the State Department has expressed a policy in favor of imports.

Conscious of the gap in national policy created by the lack of information on quantity of imports and the resultant inability of the industry and the producing states to ascertain within any reasonable limits what the prospective total supply may be needed, many in the industry and in the state governments have worked for several years to obtain a greater understanding of the importance of this question. There have been encouraging expressions from members of Congress who have given thought to our future petroleum resources and it is still more encouraging that greater attention has been paid to the question in the seventy-ninth and the eightieth Congress than ever before. Perhaps of equal or even greater importance is the fact that the industry itself is now as a whole closer to accord in the thought that first reliance must be placed on our resources in the United States. The soundness of such program was demonstrated so thoroughly in our latest war that any who would advocate dependence on foreign resources owned by countries whose policies may change or who may be separated from us by hostile forces, have no argument that will stand up in the face of undisputed history.

Limit on Imports

A few days before the final business meeting of the Petroleum Industry War Council, the Independent Petroleum Association of America had declared in a resolution of October 17, 1945, that " . . . the domestic industry should always have the first opportunity to supply the petroleum needs of the United States at fair prices. If at any future time imports are necessary to supplement the domestic supply they should be only in amounts required to furnish adequate government and civilian requirements. They should not be in quantities that would be harmful to the domestic industry."

This expression was paralleled just 7 days later in a PIWC resolution: " . . . it does declare that in the public interest of maintaining national security it should be the policy of this nation to so restrict the amounts of imported oil so that such quantities will not disturb or depress the producing end of the domestic petroleum industry, and only such amounts of oil should be imported into this country as is absolutely necessary to augment our domestic production when it is produced under conditions consonant with good conservation practices." The vote was unanimous.

Eugene Holman, president of Standard Oil Co. (N. J.), speaking in Bradford, Pa., on June 19, said:

"In the Jersey company, to determine our total crude-oil needs we first calculate domestic demand to which we add export requirements. From that figure we deduct the amount of oil which can be supplied from our own domestic production plus our domestic purchases from others. Any deficiency is then made up through imports. A national policy might well follow the same procedure. The domestic oil industry should have the first opportunity to supply the petroleum needs of this nation at fair prices. I do not know how I can assure you in any plainer words that we in Jersey Standard believe that imports should be used to augment and not to destroy."

Appalachian Short Course In Gas Measurement Set

The 1947 Appalachian Gas Measurement Short Course will be conducted August 25-27 at West Virginia University, Morgantown, W. Va.

The 3-day program will include nine technical sessions during which more than 70 technical reports will be delivered. The regular program will be supplemented by equipment exhibits to be held each morning before the regular session.

The primary purpose of the school is to provide an opportunity for persons to learn to repair and operate equipment and to acquaint them with the latest developments in the gas-measurement and the pressure-regulation field.

This will be the seventh such school to be held since 1938.

I.P.A.A. Calls for Higher Crude Production Rate

The Independent Petroleum Association of America in its quarterly report released August 12 estimated total third-quarter crude-oil demands at 5,130,000 bbl. daily, domestic production, plus imports averaging 470,000 bbl. daily.

Future estimates of need for domestic production included: Fourth quarter, 5,170,000 bbl. daily; first quarter 1948, 5,190,000 bbl. daily; and second quarter 1948, 5,290,000 bbl. daily.

Leave Program Announced

A program under which employes who are members of reserve military components will receive leaves of absence for military training periods has been announced by Stanolind Oil & Gas Co. The plan provides no loss in earnings up to 3 weeks of training and does not affect annual vacations. Similar military-leave programs have been instituted by a number of other oil companies.

this week

RECORDS—Oil industry sets four new all-time marks as it moves to meet unprecedented demand. . . . Well completions for week ending August 9 reach 781, including 125 wildcats. . . . Crude runs for week of August 2 average 5,271,000 bbl. daily. . . . Gasoline production during same week hits all-time peak of 16,517,000 bbl. . . . Drilling activity passes previous records with 1,909 rotary rigs operating throughout the country. . . . ¶Bureau of Mines estimates August crude runs of 5,130,000 bbl. daily needed, with 42 per cent gasoline yield, to meet total demand of 78,000,000 bbl. . . .

INTERNATIONAL—Anglo-Transvaal group of South Africa announces plans for commercial coal-gasification project. . . . ¶Sinclair Petroleum Co. reveals it is shipping deep-test rig to Ethiopia. . . . Plans to start drilling program in near future. . . . ¶Standard Oil subsidiary in Italy seeking exclusive exploration rights in Po Valley, opposed by Communists. . . . Company now intensifying operations near Venice. . . . ¶Joint American and British refinery in Lobau, Austria, seized by Russians, built with blocked funds without company knowledge, officials declare. . . . ¶New Russian overtures for concession in Iran expected with return of Soviet ambassador. . . .

PIPE LINE—Michigan-Wisconsin Pipe Line Co. plans start on construction of 1,069-mile system by January 1. . . . Company now seeking to obtain sheet steel for fabricating pipe. . . . ¶Tennessee Gas Transmission Co. authorized by FPC to increase capacity of pipe-line system to 600,000,000 cu. ft. of natural gas daily. . . . Project to cost over $53,000,000. . . . ¶Sunray Oil Corp. salvaging pipe for Beckett-Allen, Okla., line. . . . ¶El Paso Natural asks authority to increase facilities. . . .

GOVERNMENT—W. S. Hallanan, president of Plymouth Oil Co. and chairman of N.P.C., speaking at Oil Compact meeting, warns industry must cooperate with Government to avoid "disastrous consequences." . . . ¶U. S. Chamber of Commerce President Shreve protests to secretary of state over proposed U.N. control of world oil. . . . ¶Secretary Krug calls meeting of nation's refiners to determine methods of meeting needs of armed forces. . . . ¶Bureau of Land Management flooded with applications for offshore leases off Louisiana coast. . . .

PRICES—Products prices continue upward as supplies grow tighter. . . . Spot market dries up as exchanges become the rule. . . . ¶B. A. Hardey, president of I.P.A.A., predicts increase in crude-oil price within 90 days. . . . Says price will stay high 4 years. . . .

EXPLORATION—New pay in Piedras Pintas field, Duval County, Texas. . . . ¶Rowan & Hope open new gas-condensate pool in Bee County, southwest of Howard pool. . . . ¶Union Sulphur Co. opens new gas-condensate pool in Beauregard Parish, 3 miles east of Perkins field. . . . ¶East Lindsay pool extension, McClain County, Oklahoma, has 422 ft. of tested oil pay. . . . ¶Sinclair-Wyoming Oil Co. opens new pool with 540-bbl. well in Madison lime, 1 1/4 miles northwest of Elk Basin field. . . . ¶Pacific Western Oil completes exploratory test in Kern County, California, flowing 552 bbl. . . . ¶Leduc field, Edmonton, Canada, is extended 1 mile northwest. . . .

The South Point compressor station, recently completed for Ohio Fuel Gas Co., is in Fayette Township, Lawrence County, Ohio, on an 18-in. transmission line connecting at the Ohio River to United Fuel Gas Co.'s discharge line from its Kenova compressor station. The present operating load is 80,000,000 cu. ft. daily at an intake pressure of 290 psig. and discharge pressure of 425 psig. It is planned ultimately to enlarge the station to a load of 140,000,000 cu. ft. at a discharge pressure of 750 psig. for transporting pipe-line gas to northern Ohio markets and storage areas. The station has four 600-b.hp. Clark Model RA-6 super 2-cycle, right-angle, gas-engine-driven compressors and necessary auxiliary equipment. The station was constructed by the chemical plants division, Blaw-Knox Construction Co., Pittsburgh

International

WORLD-WIDE OIL DEVELOPMENTS

Standard Increases Operations in Italy; Asks Po Valley Rights

THE Italian subsidiary of Standard Oil Co. (N. J.), which began an oil-exploration program about 2 months ago, has intensified operations in recent weeks and has petitioned the Italian Government for exclusive exploration rights in a 6,000-square mile area of the Po Valley.

Early this week the Communist newspaper Pravda in Moscow strongly criticized the efforts of the subsidiary, Societa Petrolifera Italiana, suggesting it was the beginning of efforts of American oil firms to "exploit" the country.

The company reportedly has 60 per cent American and 40 per cent Italian capital.

Edward C. Borrego, general manager of the Italian company, said Standard plans to spend about $300,000 in its program if unsuccessful in its search for oil and an estimated $5,000,000 if it decides to drill.

Italy in 1946 had 433 producing wells, only 7 of which were flowing, but total production was so small that it provided only a negligible amount, compared to the country's demand.

Tests Near Venice

Exploration activity currently is centered about Ferrara, some 60 miles southwest of Venice. Results, Borrego said, will not be known for another month and drilling, if tests are successful, will not get under way for an estimated 2 years.

Standard's proposal to the Italian Government provides that the company would turn back 25 per cent of the explored concession every 3 years, keeping only that portion in which drilling was contemplated.

Whether the concession might be granted was a matter of speculation, since the proposal is being attacked strongly by Communist influences. Guiseppe Togni, Christian Democratic minister of commerce and industry, reportedly favors the granting of the concession but has expressed doubts over the timeliness of the proposal in view of the present political situation.

The current fuel shortage, one of Italy's worst shortages, may have a favorable effect in the consideration of the Standard proposal, observers believe, since increased production of petroleum products might be expected to greatly ease many of the country's reconstruction problems.

Soviet Oil Allocations In Austria Questioned

ALLOCATIONS of oil from the Russian-controlled zone of occupation, a subject which has occupied the Austrian Control Council in several sessions during the past year, again has been brought before the council by British and United States representatives.

In a report to the council Lieut. Gen. Sir James Steele, British member, estimated the monthly yield of the Austrian fields at 65,000 tons and declared the amount actually made available to the Austrian economy in July was 26,000 tons.

The council tabled a resolution of General Steele expressing "anxiety" at the downward trend of allocations by Soviet authorities for the use of the Austrian people and asked the Soviet delegate to furnish full particulars of what oil was being exported from Austria and what payments were being received in return.

Gen. Vladimir Kurassov, the Soviet member, refused to discuss the matter and declined to give any assurance that Steele's requests, concurred in by Lieut. Gen. Keyes, U. S. high commissioner in Austria, would be met.

When the British and American members of the council raised the question in June last year, the Soviet member then refused to discuss the matter. The Austrian Treaty Commission in June began discussions on Austrian oil as one "German asset" which needed investigation and definition.

The Russian definition would give them control of 70 per cent of Austrian crude production, including that of the large Zistersdorf oil field. The question was raised again at the July 11 meeting of the Control Commission, at which time General Kurassov promised an investigation.

Blocked Dividends Built Lobau Plant, Officials Say

American representatives of the joint American Vacuum Oil and British Shell Oil refinery in Lobau, Austria, which was seized last week by Russian troops, said last week that the refinery and pipe line were built with blocked dividends due the parent companies.

In 1942, when the American parent companies had no effective supervision over the German subsidiaries, the Lobau refinery was built, according to the Vacuum and Shell representatives. The American company first learned of the plant's existence through military intelligence.

The refinery, a topping plant on the outskirts of Vienna, is said to be the largest in Austria, and is estimated by Americans to be worth $6,000,000 to $7,000,000, including the pipe line and installations.

The issue of rightful ownership was in the hands of the Vienna Treaty Commission when the Russian troops took over. Russian authorities contended the plant is a German asset under the Potsdam agreement.

Colombian Legislature Gets New Oil Proposal

Now before the Colombian legislature is the proposed new oil bill, submitted by the Colombian Petroleum Council.

Based largely on the oil law now

in effect, the proposed code in its present form is looked upon by observers more as a statute designed for a commercially producing country than for a country still in the exploratory and wildcatting stage.

The proposal reduces the acreage of drilling concessions, where large acreage normally provides protection in a wildcatting program; increases the costs of acquiring and holding a wildcatting concession; and increases the cost of producing oil through higher income taxes and royalties, added fiscal payments, and additional social and labor benefits.

Considerable modification is expected while the bill is under consideration by the legislature's oil committees and later in the course of legislative debate and study.

Sumatra Fields Suffer Only Minor Damage

Only minor damage has been inflicted on the oil fields and refineries in southeastern Sumatra by the retreating Indonesians, it was reported by Dutch civil authorities and American oil men at Palembang.

A few wells were fired at Pendopo but all blazes are now under control.

Royal Dutch Shell's Pladjoe refinery, which escaped damage in World War II and the current fighting, is expected to be in full production soon.

Standard-Vacuum Oil Co.'s Soengai Gerong refinery, now being rebuilt, will be in full production by October, company officials report.

Strike Leaders Sentenced By Court in Teheran

The military governor and the ex-chief of police of Abadan, the Persian Gulf oil port, have been sentenced to 1 year's imprisonment by a court in Teheran for their part in the strike among the employes of the Anglo-Iranian Oil Co., according to reports from Teheran.

The strike, which took place during July of last year, affected about 50,000 workers.

Coal Gasification Project In South Africa Planned

The Anglo-Transvaal group of mines is awaiting the grant of a license by the South African Government to begin commercial production of oil from coal, according to a representative of that organization.

No estimate of output was indicated, as such will be determined by the Liquid Fuel and Oil Industry Advisory Board.

Licenses are issued only to Union nationals or companies registered and having their head offices in the Union. Maximum and minimum output and the maximum price and profits will be specified when the license is granted.

Netherlands to Pay War Damages to Americans

The Netherlands Embassy in Washington has informed the Department of State that the Netherlands government will grant compensation for war damage sustained to property in the Netherlands of American nationals on a basis of equality with Netherlands nationals.

This action by the Netherlands government will take in recognition of the fulfillment by the United States Government of the reciprocal obligation.

The Netherlands law provides for payment for damage sustained in the Netherlands as a result of the war to immovable property and to most types of movable property.

Drilling in Ethiopia Due to Start Soon

Drilling operations in Ethiopia by Sinclair Oil Corp. are expected to begin soon following the arrival at Djibouti of three shiploads of oilfield and geological equipment. A fourth ship is now en route from New York.

Sinclair Petroleum Co., subsidiary of Sinclair Oil Corp., said early this week the first deep-test rotary-drilling unit, capable of drilling to depths in excess of 12,000 ft., has been assembled and is expected to leave port later this week.

In addition, the company will ship a motorized rotary-type water-well drilling machine, together with two water-well pumping units and water purification systems. Also to be shipped are a portable stone-crushing plant, and other road-building equipment.

Operation camps will be set up in three prospective oil-bearing areas of Ogaden province. Twelve American geologists are now en route there.

Sinclair Oil Corp. has a 50-year monopoly concession for oil exploration throughout Ethiopia (for details on Sinclair's concession, see The Oil and Gas Journal, April 12, page 60, and May 3, page 44).

World Oil Control Plan Killed by U. N. Council

The United Nations Economic and Social Council meeting at Lake Success this week killed by a vote of 8 to 2 a proposal of the International Cooperative Alliance for international control of Middle East oil resources.

Led by the United States, Great Britain, and Russia, the council voted only to "take note" of the proposal.

International

Haft Kel Field Leads Anglo-Iranian Production

Production of Anglo-Iranian Oil Co., Ltd., in 1946 totaled 19,189,551 tons (about 145,290,000 bbl.), according to B. R. Jackson, American representative for the company.

Production by fields was: Haft Kel, 8,750,448 tons; Agha Jari, 4,065,739 tons; Masjid-i-Sulaiman, 3,674,797 tons; Gach Saran, 1,879,096 tons; White Oil Springs, 699,389 tons; Naft-i-Shah, 92,712 tons; and Pazanun 27,370 tons (gasoline).

1950 Set for Third World Petroleum Congress

The Permanent Council of the World Petroleum Congress met recently in London for the first time since the war and fixed 1950 as the date of the Third World Petroleum Congress.

The council expressed preference for the United States for the meeting. The first congress was held in London, the second in Paris. Col. L. Pineau presided at the recent London meeting as council president.

Arabian Prince Visits Oil-Production Centers

Prince Saif Al Islam Abdulla of Yemen Province, Arabia, toured Oklahoma City oil fields this week and then left for Texas to visit facilities of Phillips Petroleum Co. in Amarillo, Borger, and Phillips.

From Texas the visiting prince was scheduled to go to California. In Oklahoma City after an air trip from Washington the prince said he wanted to study oil production because of plans of several American companies to conduct explorations in his country.

German Output Down

Petroleum production in Northwest Germany in June amounted to 49,049 tons (about 371,000 bbl.,) bringing the output for the first half of this year to 272,251 tons (about 2,060,000 bbl.) The average monthly production in 1946 amounted to 53,500 tons (about 405,000 bbl.)

Holland Ends Rationing

All rationing of gasoline in Holland has ended, effective this month, according to an announcement of the Dutch Ministry of Economic Affairs.

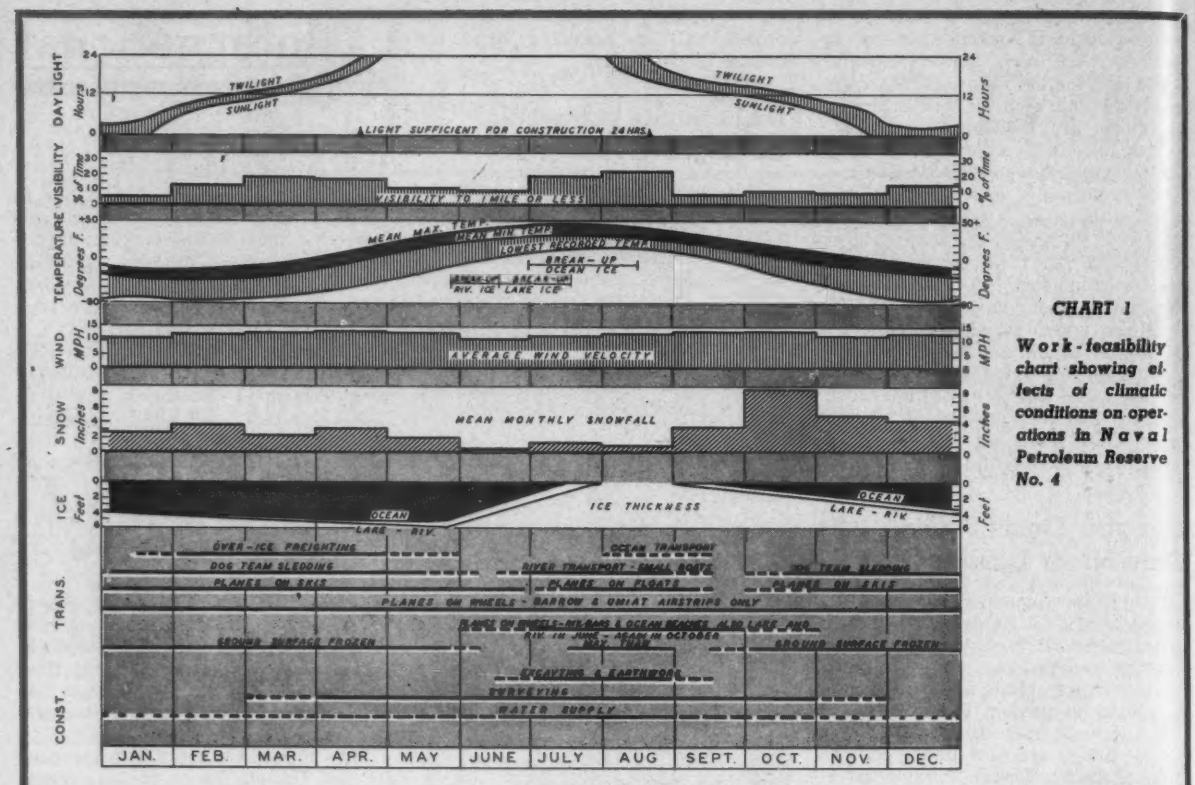


CHART 1

Work-feasibility chart showing effects of climatic conditions on operations in Naval Petroleum Reserve No. 4

Climate Major Factor in Determining Exploration Work in Northern Alaska

by C. O. Willson

POINT BARROW, Alaska.—The long-range policies and direction of the exploratory operations in Naval Petroleum Reserve No. 4 center in the sessions of the operating committee which meets twice yearly at Washington. The committee convened last November and reviewed the 1946 activities and agreed upon the principal operating plans for 1947. The committee met again in April. Members of the operating committee who attended this meeting at which Commodore Greenman presided were: Col. Ottmar F. Kotick, Army-Navy Petroleum Board; Dr. William E. Wrather, director of U.S.G.S.; Lt. Com. Fred Cooke, U. S. Navy Bureau of Yards and Docks; Lewis W. MacNaughton, DeGolyer & MacNaughton; A. A. Curtice, Hoover, Curtice & Ruby; and Walter A. English, chief technical advisor. English, who became a member of the operating committee this year, is a widely known geologist and geophysicist who for several years was chief geologist of Superior Oil Co.

THIS is the second of a series of three articles describing exploratory operations now under way in the 35,000-sq.-mile area of Naval Petroleum Reserve No. 4, located in Arctic Alaska. The previous article (August 9 issue, page 62) described the program which has been under way for the past 3 years, the organization that has been perfected to carry on the work, and the Navy plans should important oil reserves be discovered. A third article in the August 23 issue will deal with the use of airborne, surface, and subsurface equipment which has been used in the search for Arctic oil. The articles are based on data obtained by the author in a visit to the reserve last month.

In addition to the operating committee a number of representatives of the Navy, U.S.G.S., Bureau of Mines, and Arctic Contractors who are actively engaged in the reserve operations attended and made reports. Indicative of the manner in which the exploration program is carried out, the operating committee in April met to consider the following matters:

1. Study the results of the work performed since the last meeting and to receive the final geological and geophysical reports which were presented in preliminary form at the last meeting.

2. Receive progress reports on paleontologic studies and review of thin-section analyses of sand cores from 1 Umiat and 1 Umiat Core Test.

3. Study the program of operations for 1947 agreed to by this committee

Field transportation during summer period. Passengers from amphibious airplane take amphibious weasel to drilling test. Shown are: R. Clark, Arctic Contractors; Sig Wien, Wien Alaskan Airlines; Com. W. G. Greenman, director of Naval Petroleum Reserves, and A. E. Clark, Arctic Contractors

at its fifth meeting with the objective of making any desirable modifications in view of the funds available.

4. Receive the report and recommendations of the Chief Technical Advisor.

5. Receive the report of Bureau of Mines chemists on analyses of oils found in 1 Umiat and in 1 Umiat Core Test.

In early July another meeting of several members of the operating committee and advisors was held at Umiat and minor changes were authorized in the exploration program based on developments in the field since the April meeting. Revisions and extensions in the geological and geophysical work are necessary as new information becomes available.

Operating Conditions

To understand the operating procedure in the Navy's Alaskan reserve it is first necessary to have an appreciation of the climatic, terrain, and transportation conditions which largely determine the seasonal activities. In this connection attention is called to Chart 1 which was prepared by Arctic Contractors after 2 years' operations. It will be noted that northern Alaska is an area of many extremes, which directly affect all phases of exploration.

During May, June, and July, the Arctic has continuous daylight which enables outdoor work to be carried on 24 hours daily if necessary. From early May to September 1 the highest temperatures prevail. For several weeks the temperature rarely drops below freezing with a range up to 55° F. This is the season of greatest operating activity in the reserve so far as drilling and exploratory operations are concerned.

Unloading Ships

Early August is a critical period in reserve activities. During this time the bulk of the equipment and supplies must be brought offshore at Point Barrow in ships and landed with specially designed equipment. When the writer visited Point Barrow in early July final preparations were being made for the arrival of four A.K.A. Navy ships* and one icebreaker which were scheduled to leave Seattle in late July with the bulk of the materials, supplies, and special equipment which will be needed to carry on field and camp operations during the remainder of this year and until August 1948 when new shipments will arrive. The program called for the delivery of 22,000 tons of supplies for the reserve and approximately the same tonnage for the Army. The Eskimo tradesmen whose operations center in the village of Point Barrow also receive supplies.

*These ships were reported offshore and unloading at Point Barrow last week.

International
WORLD WIDE OIL DEVELOPMENTS

The procedure that has been devel-

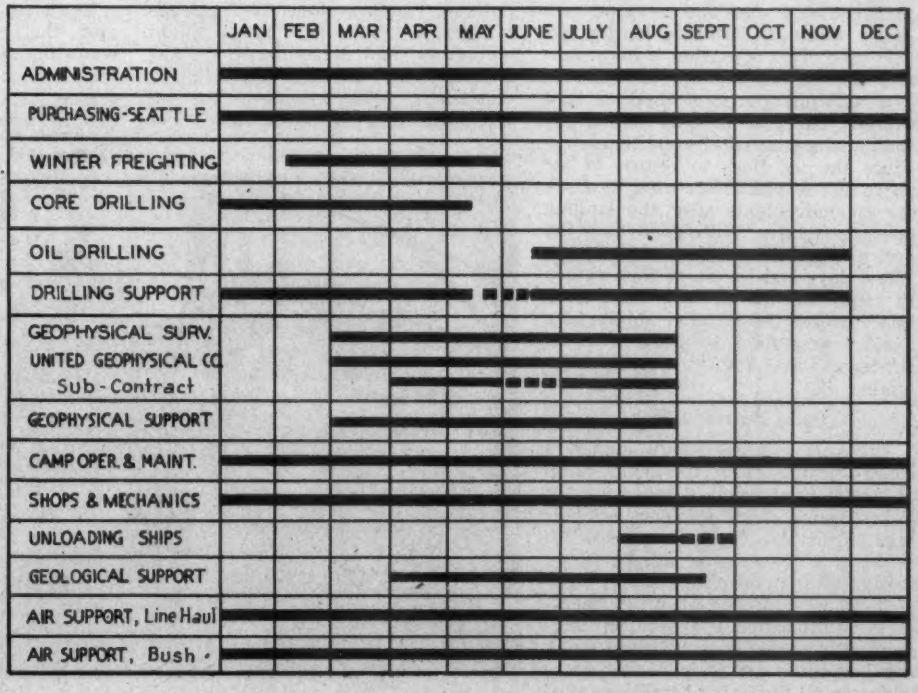


Chart 2—Schedule of 1947 operations of Arctic Contractors

View of Cape Simpson drilling camp near Arctic Ocean, showing swampy tundra and water during summer months

oped to unload the ships has been described in several articles, and a movie of the operation was shown at the November 1946 annual meeting of the American Petroleum Institute. It is first necessary that the ice strip along the shore move out into the Arctic; the ships then come offshore and the landing operations start immediately. Surplus Army and Navy equipment is used, including LCM 25-ton landing barges equipped with bow and landing frames and powered with diesel engines. Pontoon barges are also used. This operation is hazardous and has to be planned carefully to take full advantage of weather conditions. There is always the danger that change in wind conditions will cause the ice floes to return to the shore and airplanes are used to check the ice movements after the landing operation starts. With good luck the entire operation can be completed in a few days and the ships then return to south Alaska through the Bering Sea before the Arctic shores are again inaccessible with the start of winter in late August or early September.

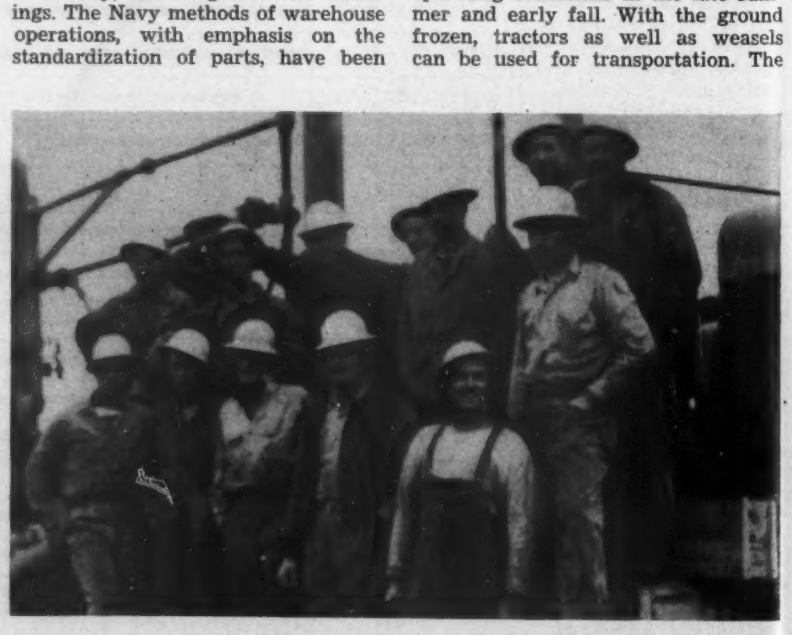
Point Barrow Camp

The yearly supplies are landed a short distance from the main camp of Arctic Contractors 6 miles east of Point Barrow, the most northern village of Alaska. No attempt will be made here to describe this camp although its method of operation is one of the most interesting and vital parts of the exploration program. In common with many oil operations outside the United States it is necessary to maintain all the living conditions usually found in a small community in this country. The camp at this time consists of 72 buildings mostly of the quonset type. In addition to the living quarters for approximately 200 men and a number of warehouses for various uses, the camp has several buildings whose designations reflect the scope of activities required to support the exploration program. These buildings include machine shops, radio and weather building, carpenter shop, cleaning plant, hospital, recreation building, underground food storage, refrigerator building, power plant, laboratory, and magnetometer buildings. The Navy methods of warehouse operations, with emphasis on the standardization of parts, have been adopted so far as possible. Quonset quarters are now being built to provide accommodations for the wives of a few employes.

As shown in Chart 1 the summer period, in addition to the continuous daylight and higher temperatures and the arrival of supplies by ships, also provides for land and inland-water transportation. The coastal area in summer consists of a marshy tundra, small lakes, and a number of flowing streams. The Army weasel is the principal method of land transportation during the summer months, and it is also widely used on the snow and ice during the winter. It is an amphibious tractor-type vehicle designed by the Army for landing operations in Europe. It will climb out of water onto ice and vice versa and rarely bogs down in the tundra. During the summer months the planes generally land on the lakes or rivers and the weasels are used to transport personnel and supplies from the planes to the drilling and exploration camps.

All excavating and earth work takes place during the summer months. The permafrost (permanent freezing of the earth's surface) extends to a depth of 700 to 900 ft. in the Alaskan Arctic. Only a few top feet melt during the summer months and this quickly freezes again by early September. Air strips are made by removing the tundra and filling in with gravel available from banks of a few streams.

The steady decline in temperatures and the snowfall quickly change operating conditions in the late summer and early fall. With the ground frozen, tractors as well as weasels can be used for transportation. The



Drilling crews at 2 Umiat test. Joe Stroud, tool pusher

smaller planes are equipped with skis and where necessary the Eskimo dog teams are used for transportation. Temperatures drop to as low as 60° F. below zero during the winter months and for 3 months the day consists of about 3 hours of twilight. The native Eskimos "hole in" during these winter months but activity continues throughout the year for those who expect to find oil in northern Alaska.

Chart 2 gives the operating schedule adapted to cope with the conditions shown in Chart 1. The administration, purchasing, with headquarters at Seattle; camp operation and maintenance at Point Barrow and Umiat; shops and mechanics and air support—both line haul and bush—are continuous throughout the year. The operating headquarters of Arctic Contractors are maintained at Fairbanks where all personnel and supplies shipped by air, clear before entering the reserve.

Winter Freighting

The winter freighting is done over the snow and ice with tractor trains during February, March, April, and May. A large part of the thousands of tons of materials and supplies of all kinds which are brought by ship to Camp Barrow in August are delivered to the numerous operating points by these tractor trains from early February to late May. With sled conveyances of various types the tractor trains, often consisting of several units, cross the ice and snow and, leave equipment and supplies wherever they will be needed over the next several months. Long trains, powered by several tractors, preceded by a snow plow and escorted by weasels are familiar sights in the reserve during the transportation period.

The principal supplies over the past year went to Cape Simpson and Umiat where two tests are now being drilled. Umiat, in addition to being the drilling site for one of the tests, is also the headquarters for a large part of the geological and geophysical work of the summer months. For this reason it is necessary to maintain at Umiat a camp similar in many respects but smaller than the main camp at Point Barrow.

Core test which produced crude oil from shallow depth. Offsets 2 Umiat, now drilling

An important feature of this winter freighting has to do with the delivery of supplies to the geological and geophysical crews. Because it is impossible to deliver supplies overland from Barrow and Umiat during the summer season, caches are delivered over the frozen tundra. These deliveries are made from maps which indicate the position of the geological and geophysical crews throughout their operating season. These supplies include packaged foodstuffs, gasoline and furnace oils, dynamite, and all the other supplies and materials required for this type of work.

International
WORLDWIDE OIL DEVELOPMENTS

Facts About Alaska

Area.—586,400 sq. miles or more than twice the size of the State of Texas.

Population.—Approximately 80,000.

Temperatures. — Range from 90° F. above to 60° F. below zero.

Business activities. — Fishing and salmon canning, furs, gold mining, coal mining, and agriculture.

Statehood. — Active campaign to make territory fiftieth state following Hawaii.

Military.—Developments during World War II and since have increased military importance of territory including large area north of Arctic circle.

Petroleum.—Small shallow production (less than 100 bbl. daily) at Katalla in south Alaska which has been abandoned. Three dry holes (last in 1940) drilled on Alaskan peninsula. Active exploratory program now under way in Naval Petroleum Reserve No. 4, an area half as large as the State of Oklahoma.

Deliveries by tractor trains are supplemented by air deliveries throughout the year. Over the past season it was necessary to deliver drums of gasoline for certain locations by using parachutes. This operation was perfected by the bush pilots so that 10 or more drums were dropped within a radius of 50 ft.

Drilling

Core drilling, geological, and geophysical crew operations are carried on during the months shown in Chart

View of part of Camp Barrow, field headquarters for operations

2. These activities will be described in a later article.

The two drilling rigs are National 50s. The derricks are 122-ft. Ideco, and D-13000 Caterpillar diesels are used for the prime movers. No special formation difficulties were experienced in drilling the 1 Umiat to 6,005 ft. and none is anticipated in drilling the two tests which were spudded in during June. The drilling rigs include all the equipment required for the coring and other tests commonly made in an exploratory well. A Geolograph and Baroid gas detector are in continuous useage, as are complete blowout equipment and hole-deviation survey instruments. Each rig, in additon to the crew and toolpusher, has a geologist and engineer working under the direction of the engineering and geological departments.

It is necessary to enclose completely the rigs except during the summer months and this is done with a plywood rig house and insulated canvas for the derrick. To prevent freezing at outside temperatures as low as —60° F., provisions are made for steam heating within the derrick and rig house. Special provisions are made to assure satisfactory mud temperatures within the enclosed rig area.

Probably the most unusual feature of the drilling has to do with the practices that have been perfected to cope with the permafrost condition. As previously explained the upper tundra melts a few feet during the summer months. This necessitates a construction in which the rig is supported by the permanently frozen earth throughout the year. This is accomplished by drilling holes with the aid of steam and sinking piling below the melting point.

Placer drilling points are used in drilling the holes. The piling is set in the muck, ice, and silt to a minimum depth of 15 ft. The 74 piles are covered with heavy grease and tar paper the first 8 ft. to provide for heaving. Skill is required to secure uniform holes. The piling is capped with 12-by-12-in. timbers.

The cellar underneath the rotary is 8 by 8 ft. and 2½ ft. deep, lined with 1 ft. of moss. Top of moss is covered with Celotex. The floor is concrete with 6-in. layer of tundra as insulation. The mud tanks are insulated.

Insect Control

Probably every reader has heard of the mosquitos and flies of the summer months in the Arctic areas. Information from bush pilots, geologists, and other field men, who have spent a year or more in the reserve, indicate that the statements regarding the size, number, and effectiveness of these insects in harassing people engaged in outside work have not been exaggerated.

The Navy is making progress in solving this problem. Entomologists from the service who had wide experience with this problem at scattered points throughout the world during the war, are now engaged in making studies at Umiat. Sprays with the use of airplanes are being used effectively and it is believed that the annoyance of this "plague of the Arctic summer" will be minimized in so far as the established camps are concerned. Head nets, gloves, and liquid repellents are used by personnel in the fields.

Water supplies are obtained for camps and drilling tests from lakes and rivers. Shallow bodies of water freeze to bottom during winter, necessitating care in selection of winter supplies. All heating is done with furnace oils delivered in drums. The same product is used for diesel fuel. Special Arctic clothing developed by the Navy and Army is used for winter work.

I. P. A. A. President Predicts Oil Price Rise in 90 Days

B. A. Hardey, Shreveport, La., president of the Independent Petroleum Association of America, told oil men last week in Cut Bank, Mont., that the price of oil will rise within 90 days and stay high for 4 years.

He declared the "policy of some officials to conserve the nation's oil reserves through heavy imports" is injurious to the industry.

Hardey said Department of Commerce records reveal a shortage in tubing is aggravated by this nation's shipping of tubing to Russia's satellite nations, which in turn are trading it to the Soviet for wheat.

Clark Asked to Clarify Statements on Tidelands

United States Attorney General Tom Clark last week was called upon by Texas Land Commissioneer Bascom Giles to make a "clear and definite" statement regarding his stand on Texas' claim to its tidelands.

Clark, who successfully represented the federal Government suit against the State of California, has said, according to Giles, that upon annexation Texas retained all of the land within its boundaries, including the marginal sea.

However, Texans, Giles continued, want Clark's stand clarified, for in a speech before the National Association of Attorneys General he said: "The decision of the Supreme Court, we hope, will settle the question as to all the coastal states of the Union." Giles accused Clark of "talking one way for Texas consumption and another way for Washington consumption."

Clark, in Texas on a visit, indicated the tidelands controversy is a tempest in a teapot and "is nothing to get excited about." He said Congress probably will settle the matter so that future suits over tidelands will be unnecessary. However, he said, he would make no statement concerning the relative merits of California and Texas claims "while the California case is still before the court."

Sinclair Companies Sign General Wage Increase

NEW YORK.—The first general wage increase for a fixed period in the oil industry for 1947 has been signed by officials of subsidiaries of Sinclair Oil Corp. and the Oil Workers International Union. It affects some 9,000 production, pipe-line and refinery workers.

The 1-year agreement, retroactive to July 1, replaces the cost-of-living allowance agreement made last year which was adjusted quarterly in accord with the consumer's price index of the Bureau of Labor Statistics.

It provides for a basic raise of 15 cents per hour and a cost-of-living allowance of 10 cents, to be paid regardless of fluctuations in the price index. No wage requests are to be made during the life of the agreement except for classification inequities which may arise. The national working agreement was extended for 1 year, from July 1, which agrees with the provisions of the Taft-Hartley law.

A wage adjustment for salaried employes will be announced shortly, the company's statement said.

Tank-Truck Movement Of Products Increases

Transportation of petroleum products by motor freight during June showed an increase of 8.5 per cent over May. Petroleum products accounted for about 9 per cent of the total tonnage handled, the American Trucking Associations, Inc., reported.

The total volume of freight carried by motor carriers in June increased 12.7 per cent over June of last year.

Abilene Men Buy 18 Coleman County Wells

Sale of 18 producing wells in Coleman County, Texas, to H. T. Owen and H. H. Adams, Abilene, has been announced by E. Constantin, Jr., Dallas.

Consideration was reported to be in excess of $300,000. Two of the 18 are gas wells. The other 16 are oil wells in the Morris sand.

Oil Industry's Advertising Program Gathering Company Support

THE advertising campaign launched earlier this month by the oil industry's public-relations organization is rapidly broadening in scope as individual oil companies take advantage of the opportunity to coordinate their local advertising with the national program.

The public-relations operating committee functioning under the American Petroleum Institute is making available through the district public-relations committees an elaborate brochure containing suggested company advertising and other material tied in to the national campaign.

Life magazine was used to initiate the national program early this month when it carried a full-page color advertisement. The same message will be run by Saturday Evening Post, Collier's, and Look this month and early in September. These general-circulation publications reach an estimated 58,800,000 persons. Four other ads in the current series in color and in black and white will appear in the same magazines at intervals over the remainder of the year.

The advertising program represents the second and major step taken in the public-relations program which was authorized at last November's A.P.I. meeting following a nation-wide survey of the attitude of the public in general to the oil industry. *(The Oil and Gas Journal, November 16, 1946, pages 170-179).* First was the organization of public-relations committees to represent all branches of the oil operations. This was carried out throughout the first half of this year.

Theme of Program

Theme of the advertising program is the rivalry and competition characterizing the industry. This is aimed at the misconception—brought out in the opinion survey—that the petroleum industry is monopolistic and retards progress. The initial ad, with illustrations by Saul Tepper, nationally known painter, portrayed the rivalry now in progress among amateur gardeners over the country, using this to explain that similar rivalry motivates American business, including the oil industry.

The public-relations operating committee, headed by Franklyn Waltman, Sun Oil Co., and the various district organizations are urging oil companies of all types and sizes to tie the public-relations message into their own advertising of products or services. Other advertising is being carried in press trade magazines and leading oil-trade publications.

The brochure distributed by the committee contains reprints of the national ads and suggested material for local dissemination. Color reprints of the lead-off ad are being distributed for use as posters. The brochure also suggests radio commercials, post age-meter slogans, posters, and stickers. Another tie-in feature is a suggested newspaper series of one-column sports reviews written by Ed Thorgersen, well-known sports commentator, and comparing the spirit of rivalry in athletics with that in the petroleum industry.

New Organization Will Combat Blowouts, Fires

WELL PROTECTION CO., Inc., a nonprofit organization to handle oil and gas well blowouts and fires, is now being formed within the industry.

C. P. PARSONS

The company, headed by C. P. Parsons, is entirely owned by participating concerns within the industry. Headquarters and the first units of equipment will be stationed in Houston, since the Gulf Coast is a high-pressure area and the scene of the greatest number of blowouts in the past.

In its initial bulletin, the functions of the company were described as: to maintain special fire-fighting and blowout equipment and highly skilled men; to make arrangements whenever possible for the use of supplemental equipment and personnel; to carry on a training program to train key men for the future; to have an engineer at each blowout or fire to make photographs and time studies of the killing operation; to conduct research on new equipment and methods; to develop methods and equipment to prevent blowouts; and to carry adequate insurance on its own employes and assist in obtaining insurance programs to cover all employes furnished by a subscriber at a blowout.

In addition to Parsons, officers are M. M. Kinley, vice president in charge of field operations, and H. E. Hamilton, Morris-Hamilton Drilling Co., secretary and treasurer.

Directors include M. V. C. Bradley, Magnolia Petroleum Co.; H. B. Fuqua, Gulf Oil Corp.; E. P. Hayes, The Texas Co.; and C. E. Sutton, Pure Oil Co.

To finance the company, participating drilling contractors will pay $150 per drilling rig per year, based upon the number of rigs owned and operated as of July 1, 1947, and oil operators will pay $100 per well per year, based on 1946 completions in area. Initially, areas affected are the Texas Railroad Commission Districts Nos. 2, 3, and 4.

Texas Commission Boosts Allowables For August

AUSTIN.—The Texas Railroad Commission has announced a change in the general shutdown order, raising crude production 20,841 bbl. daily, to a new calendar-day total of 2,498,834 bbl. daily.

In connection with the special order Commissioner W. J. Murray, Jr., said it was issued in response to urgent requests by the oil industry for more crude, and to take advantage of the increased capacity of pipe lines during hot summer months. The general shutdown pattern was amended throughout the state to allow each field to produce at a rate near its maximum.

Murray said there are a few fields remaining whose allowables are less than their maximum rate of efficient production, but to increase the allowables of these fields would require a complete reworking of the proration schedule. After this reworking is done, he pointed out, the only way to further increase production will be to deliberately assign allowables in excess of their present MER.

Standard Oil Co. (Ind.) Commended by N.C.I.P.A.

Standard Oil Co. (Ind.) and its leaders were commended August 7 at the end of a 2-day meeting of the National Council of Independent Petroleum Associations, for initiating its gasoline-allocation plan. Standard (N. J.) soon announced an allocation plan and other companies rapidly followed suit.

Dr. Robert E. Wilson, chairman of the board, and A. W. Peake, president, accepted the honors in behalf of the Indiana company. In addressing the council both Wilson and Peake declared there is an inevitable economic trend toward the importation of more crude to meet American needs, chiefly through South America, while Middle Eastern crude is expected to supply the Eastern Hemisphere.

Tank Farms - Truck-Barge Terminals - Drilling Installations - Pump Installations

BROWN & ROOT, Inc.

BROWN-BILT
P. O. BOX 2634
HOUSTON 1, TEXAS

WASHINGTON WATCHING

BY HENRY D. RALPH

Military Needs Considered

WASHINGTON.—An urgent plea to meet military petroleum-supply requirements in full and promptly will be made to the heads of all large refining companies who have been asked to meet with Army and Navy officials in Washington August 15.

Invitations have been sent to all refineries in the country with a capacity of 15,000 bbl. per day or more, and to some smaller ones which are particularly adapted to produce products of military specification. The requests went out through Interior Department's Oil and Gas Division, but the armed forces will explain their needs directly.

The military supply situation is not quite so acute as it was a few weeks ago as regards most products, though aviation gasoline is so short that flying is being curtailed even further. The chief concern at the moment is that supplies will be very short in the fall and winter when the fuel-oil situation is expected to be most critical. The services have modified their product specifications and contract terms and will accept a reasonable escalator clause to protect sellers against market-price advances, and they have been able to place some long-term contracts in recent weeks but are still far short of covering their anticipated requirements.

The refiners will be told that government needs are only 5 or 6 per cent of total consumption but that the nation will suffer far more if these are not met than if an equal deficiency in gallonage were spread among civilian consumers.

PAW History on Press

THE Government Printing Office has locked up the forms on the history of Petroleum Administration for War, and the 550-page volume will soon be rolling off the presses.

It is expected to be one of the typographically best jobs ever turned out by the GPO, and it may also be one of the fastest sellouts. Orders are still being accepted, but once the presses stop the books will be closed and the type remelted. The American Petroleum Institute has ordered 10,000 copies for distribution to libraries and colleges, and another 1,000 on behalf of oil companies ordering in quantity. About 1,000 copies will be held back for official government use, and only 500 will be available for sale to the public as single copies.

The single-copy price has not yet been fixed, but it probably will be close to $4.00, since the book will contain 40 illustrations and 9 color charts. The A.P.I. will relay quantity orders for oil companies until the Printing Office clamps on its deadline. All oil men who took a prominent part in PAW or its committees or Petroleum Industry War Council have had a hand in compiling this history, but the bulk of the work was done by Dr. John Frey, who was an assistant deputy administrator of PAW and is now head of the marketing division of A.P.I.

Oil-Shortage Squeeze

THE phase of the oil shortage which is likely to cause the greatest political ruckus is the squeeze it is putting on independent jobbers and distributors. Official Washington is being flooded with complaints from independent oil men saying that the major companies have cornered their former sources of supply and they are being forced out of business for lack of anything to sell.

They write to the Interior Department, the Justice Department, and to their congressmen. Interior can't do anything about it except to ask the majors to keep the supplies spread around equitably. Justice can investigate and, in due course, prosecute if it finds any evidence of a conspiracy to force out independents or of other violation of the antitrust laws.

But congressmen can hold hearings, and the Senate small-business committee has already scheduled a series on this subject, opening in Chicago August 21 and later further west. That this investigation will not be perfunctory is assured by the announcement that as special counsel for this probe the committee has retained Paul E. Hadlick, former Washington attorney now practicing in Minneapolis.

Hadlick was once with the marketing division of the American Petroleum Institute and later was secretary and counsel of the National Oil Marketing Association. He has long been a self-appointed bur under the saddle of the antitrust division on petroleum matters, and claims to have been largely responsible for egging on the Department of Justice to bring several antitrust suits against major oil companies, including the famous Madison case. Early in the war Hadlick served as counsel for the Gillette subcommittee of the Senate agriculture committee which investigated the synthetic-rubber program and led to the appointment of the Baruch committee to straighten out that involved tangle.

The most serious complaints are coming from jobbers who purchased supplies on the spot market, which has largely disappeared, or from independent refineries which have been purchased by major companies. Since many major companies are limiting their distributors to 1946 quantities and are declining to take on new distributor accounts, these independent jobbers are finding it impossible to obtain supplies.

One solution which may be offered at the hearings is that the Government allocate crude so that all independent refineries get their fair share and that products also be distributed according to the marketing pattern of some previous period. Something like this was done during the war, partly through voluntary action and partly by the Government's extraordinary powers, but it proved very complicated and was not free from complaint. Federal officials concerned with oil are generally of the opinion that such a law in peacetime would create more problems than it would solve.

Offshore Lease Applications

MORE than 400 applications to lease offshore oil lands from the federal Government have been filed with the Bureau of Land Management since the Supreme Court's tidelands decision, but they don't mean a thing at the moment.

They are all being tossed into a drawer with the 2 or 3 dozen received in earlier years, because there is no statute under which such leases can be granted. Apparently the applicants are operating on the theory that some day Congress may pass legislation implementing the Supreme Court decision by taking title to offshore lands, authorizing the Interior Department to grant leases, and specifying that applications previously filed are to get priority in consideration. However, there is no assurance that Congress will do any of these three things.

The Supreme Court has yet to act on the petition of the State of California for a rehearing of the case, and there is always the legal possibility that the court might reverse itself. There is an even stronger possibility that Congress may refuse to accept federal jurisdiction over the marginal sea and instead cede it back to the states. But if the federal title sticks, Congress might not authorize any leasing, since there is quite a

clamor for locking up the submarine oil as a reserve for posterity, or for development by the Government itself. Finally, if federal leasing is authorized there is no assurance that the law will give preference to early filers, since public bidding or some other method may be required.

The applications currently reaching Washington are from major and independent oil operators and from individuals, and all are for areas off the Louisiana coast. The Supreme Court decision applied specifically to California coastal waters only, and more litigation might be required before a federal claim can be asserted to the oil lands off any other state.

Leasing Bill Signed

PRESIDENT TRUMAN has signed the acquired lands leasing bill which was sent to him the final day of the Congress session, but it will take some time before the Bureau of Land Management can put it into effect and begin issuing oil and gas leases.

The new law authorizes mineral leases on federal lands which are not part of the public domain but have been acquired by purchase or otherwise by various government departments. Some of these are large tracts and others are small parcels, but in the past there has been no statute by which most of them could be leased for mineral development, a fact which hampered oil and gas operators in attempting to assemble blocks of acreage for new development.

Leases are to be made under the General Leasing Act which applies to public lands, provided this does not interfere with surface use of the property. However, before the law can be made effective BLM must revise its regulations and the owning agencies must make available to it their records of these lands and the necessary title papers.

FPC Again Slapped Down

FEDERAL POWER COMMISSION has been slapped down for a second time by the Circuit Court of Appeals for the District of Columbia because of its order reducing the rates charged by Mississippi River Fuel Corp.

Last May the court approved that part of the order allowing a return of only 6 per cent on investment, although 6½ per cent had been the standard allowance. But the court remanded the case to FPC with instructions to make a new computation for allocation of costs between direct industrial sales which are not subject to rate regulation, and sales to distributors which are. That decision rather severely reprimanded FPC for claiming to use the standard "demand-commodity formula" but actually deviating from it for reasons not fully explained. The court said FPC did not have to follow any particular formula but if it used any new wrinkles it had to explain them fully and they must be supported by substantial evidence.

FPC petitioned the court for a rehearing and in its turn criticized the court for misinterpreting the Natural Gas Act, invading the regulatory province of FPC, and substituting its own judgment for that of FPC. Among other things, FPC said: "The court, unlike the commission, is not an expert body and, under the rules of administrative law, cannot substitute its judgment for that of the commission."

This did not sit well with the court, and in denying the request for rehearing it said: "Be that as it may, the commission, even though expert, is forbidden to be arbitrary. And the courts are directed to prevent it from being so . . . This court, in the present case, has not reversed the conclusions of the commission, except in the procedural sense necessary to a remand. It has remanded the case for clarification where clarity is not present, and for completion where incompleteness now exists . . . The commission says that the court has substituted its judgment for that of the commission. The court has not done so. That contention in the present case is merely the recitation of a favorite cliche of administrative tribunals whose findings and conclusions have been queried by a court."

Rizley Bill Hearing?

SOME hearings on the Rizley natural-gas bill may be held by the Senate commerce committee before Congress reconvenes, but no definite plans have been made as yet. Sen. E. H. Moore of Oklahoma, coauthor of the bill and chairman of a subcommittee which held hearings prior to House passage of the measure, would like to call his group together to work on the bill this fall, and particularly to hold hearings in cities where considerable opposition has been aroused on behalf of gas consumers.

In addition to taking testimony on the bill itself, Moore would like to run down charges that much of the opposition was generated by Federal Power Commission, which he accuses of lobbying against it. However, this phase of the subject may be taken care of by the House committee on expenditures in the executive departments, for its subcommittee on extra-legal activities has announced that it will investigate several government agencies this fall and will start with FPC.

This committee has before it the charges of Rep. Ross Rizley of Oklahoma that FPC violated an old statute by spending part of its appropriation to influence Congress on pending legislation. He has turned over considerable material to the committee, including studies made by FPC in answer to inquiries from news correspondents showing how gas rates in various cities might be increased if certain natural-gas companies were permitted to base their charges on assumed field prices for gas instead of the rates fixed by FPC for gas produced by themselves or their affiliates.

FPC Rate Fixing

AN order of Federal Power Commission fixing natural-gas rates must be fair and equitable in all its elements and components, the Court of Appeals of the District of Columbia decreed in denying the FPC petition for a rehearing of its original decision in the case of the Mississippi River Fuel Corp.

The court had remanded the case with instructions that FPC use different methods in portions of its allocation of cost between jurisdictional and nonjurisdictional property for purposes of fixing rates of sales of gas to distributors. FPC complained that this was usurping its regulatory functions, but the court replied:

"The commission says that a reviewing court is limited to a consideration of the 'end result,' the rate, or price, prescribed by the final rate order for the commodity or service. It says that then the court finds this rate to be fair and reasonable its function is exhausted. Upon that premise the commission seems to contend that the court has no power to examine the composition of the prescribed rate or the several elements which together constitute the rate.

"The danger of misunderstanding and confusion arises because the commission's premise stems from a trite and true generality. It is true that if the rate prescribed by the commission be fair, reasonable, and nonconfiscatory, a court cannot disturb it. The questions are: when is a rate fair, reasonable, and nonconfiscatory? And how does a court determine whether the rate is so or not? The commission seems to contend that the court must examine the rate per se, as an abstraction, or as a naked economic fact, divorced from the elements of which it is composed and regardless of its effects; and if it appears fair and reasonable upon such examination, it must stand. Such contention is without merit, either upon reason or upon authority, and moreover is impossible of practice.

"The commission says that nowhere in its opinion did this court say that the resulting rates were unreasonable, unfair, or confiscatory. A rate order which does not provide for proper allowable expenses, taxes, depreciation and return, is unfair, unreasonable and confiscatory. We thought it unnecessary to recite that obvious basic premise."

PERSONALS

Official of Texas Co. Began as Roustabout

FROM roustabout to assistant division manager is the oil-industry career, to date, of J. Howard Rambin, Jr., with The Texas Co. Rambin on September 1 will complete his second year as assistant division manager of the company's Arkansas-Louisiana division, with headquarters in New Orleans.

Rambin graduated in petroleum engineering from Louisiana State University in 1934, and a year later joined The Texas Co. as a roustabout assigned to a crew working in a swamp in the company's Houma district.

Later he served as a rotary-rig roughneck in the same district, and in December 1935 was appointed district petroleum engineer.

In May 1938 he was promoted to the position of division petroleum engineer of the Lousiana-Arkansas division, a position he held until his appointment in 1945 as assistant division manager.

C. D. Winkelman, Texas-Gulf Coast area superintendent for Shell Pipe Line Corp., has been named to succeed **L. F. Young** upon his retirement October 1. **Claude E. Dolhonde,** Mid-Continent area engineer, is replacing Winkelman. **Henry H. List,** senior engineer, head office, is assuming Dolhonde's duties.

Barry M. Smith, leaseman for The Texas Co., has been appointed chief scout of the Oklahoma division to succeed **Wilson Metcalf,** who has been made representative of the crude-oil purchasing and sales division.

S. R. Stevens, divisional manager of the northern Alberta division of Imperial Oil, Ltd., since 1937, has been appointed manager of the company's crude-oil department. He is being succeeded by **D. L. Avison,** manager of the Saskatchewan division at Regina for several years.

L. G. Cable, recent graduate of Texas College of Arts and Industries, Kingsville, has joined the engineering department of La Gloria Corp., Corpus Christi.

J. M. Clark, district geologist for Tide Water Associated Oil Co., is resigning effective August 15, to become an independent operator and consultant at Tulsa.

J. L. Cooley has been elected vice president and director of California Research Corp., Standard Oil Co. of California subsidiary. He will be responsible for research on fuels and special products. In two other changes affecting vice presidents **W. N. Davis** was placed in charge of research on lubricating products and **L. P. Elliott** was named to handle process research and engineering.

Jay W. Turner, prominent in oilfield supply circles, has been elected a vice president of Wil-Tex Oil Corp. and S. E. W. Oil Corp., Corpus Christi, Tex. Before joining the Wilson organizations, Turner was associated with Oil Well Supply Co.

Marvin L. Drabkin, chemical engineer, was recently employed in the Beacon Laboratories of The Texas Co. Other recent additions, all chemists, are **Louis Kovach, Joan A. Rowley, Stanley E. Hammond,** and **Francis G. Ferrick. Roland W. Puder** and **Stephen Hopkins** are mechanical engineers who have recently joined The Texas Co.

M. S. Hauser, Ohio Oil Co., Findlay, Ohio, and **Jay S. Smith,** Standard Oil Co. of California, San Francisco, have been named members of the public-relations operating committee of the American Petroleum Institute.

W. C. R. Whalley, corrosion engineer with Iraq Petroleum Co., Haifa, Palestine, has been observing pipe line construction and protection methods in Oklahoma, Kansas, and Missouri on a tour of the United States.

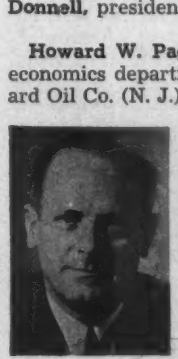
Ward W. Clopton, former assistant manager of San Antonio district, United Gas Pipe Line Co., has been promoted to district manager to succeed **E. F. Humes,** retired.

Whitney Weinrich, active in petroleum research and development and in affairs of the American Chemical Society, has joined the staff of the Houdry Laboratories as head of the pilot-plant development. He was a member of the staff of the Towne Scientific School, University of Pennsylvania, where he taught chemical engineering for the past year.

John A. Frost of the U.S.G.S. at Artesia recently made an excursion with several oil men down the San Juan River from Mexican Hat, Utah, to Lee's Ferry, Arizona, on the Colorado River, to study geological beds exposed in the high canyon walls.

M. S. Hauser has been appointed manager of Ohio Oil Co.'s newly created public-relations department, according to announcement by **O. D. Donnell,** president.

Howard W. Page, coordination and economics department head of Standard Oil Co. (N. J.), has been appointed



H. W. PAGE

J. E. COGAN

executive assistant to **Eugene Holman,** Jersey Standard president. **Jerry A. Cogan,** former assistant to Page, will head the coordination and economics department. Both Page and Cogan were on leave of absence from 1942 until late in 1945 with the Petroleum Industry War Council and the Petroleum Administration for War, of which Page was director of the program division and Cogan was associate director. Page, a Stanford University and Massachusetts Institute of Technology graduate, joined Humble Oil & Refining Co. 18 years ago. Cogan, a Colorado College and M. I. T. graduate, joined Standard Oil Co. of Louisiana in 1932.

Benton S. Brooks, Jr., of Champlin Refining Co., has resigned and will enter the consulting field in Wichita, Kans. The company has closed

PERSONALS

its Wichita office and will handle all its work from the Enid, Okla., office.

Herbert F. Miller, head of the crude-oil purchasing department of Carter Oil Co., has been made a vice president. He has spent more than 25 years in marketing and crude-oil purchasing activities and has been a director of Carter since 1933. His service with Carter and other Jersey Standard affiliates has been continuous since 1902.

O. C. Burger has joined Gordon Lubricating Co. of Pittsburgh as lubricating engineer. Burger was formerly associated with Pure Oil Co.

Thomas W. Brinkley, senior petroleum engineer, has been transferred from Tulsa to Oklahoma City by Carter Oil Co. Other recent Carter transfers and promotions include: **Kenneth C. Bayer,** party chief, overseas section, Ruston, La., as assistant seismograph computer; **Arthur E. Brink,** district foreman, Vicksburg, Miss., to Magnolia, Ark., as acting district superintendent; **Densel G. Corbin,** junior geophysicist, Falls City, Neb., to Roosevelt, Utah; **William L. Irby,** seismograph party chief, Craig, Colo., to Texarkana, Ark.

Howard C. Kauffman, petroleum engineering trainee, to Great Bend, Kans.; **Robert M. McElwain,** junior geophysicist, Falls City, Neb., to Ruston, La.; **Jack D. Shults,** seismograph engineer, Woodward, Okla., to Rolling Fork, Miss; **Coleman Sorrells,** district foreman, Lance Creek, Wyo., to Purcell, Okla.; **George A. Ashland,** geological trainee, to Billings, Mont., as a junior geologist; **Franklin Eck,** engineering trainee, to Tulsa as junior petroleum engineer; **Verne A. Farmer, Jr.,** geological trainee, to Billings, Mont., as junior geologist.

Samuel G. Gary, Jr., engineering trainee, to Purcell, Okla., as junior petroleum engineer; **Fred C. Kibler,** engineering trainee, to Carmi, Ill., as junior petroleum engineer; **George G. McRoberts,** field computer, Homer, La., to Egypt, as seismograph party chief; **Fred E. Miller,** geological trainee, to Tulsa as junior geologist; **Donald S. Roberson,** seismograph engineer, Woodward, Okla., to Texarkana, Ark.; **Bobby J. Schupp,** seismograph engineer, Texarkana, Ark., to Woodward, Okla.; **George G. Walton,** seismograph party chief, to Peru; **Edward G. Weaver, Jr.,** junior geophysicist, Warren, Ark., to Craig, Colo., as seismograph engineer.

Dr. John T. Sanford, research geologist for Magnolia Petroleum Co., has resigned to join the faculty of Wayne University at Detroit on September 1.

Warren Beebe, vice president and chief geologist of Bay Petroleum Co., has resigned effective August 15 to accept a position with Anderson-Prichard Oil Corp. in Oklahoma City. **E. L. Birmingham, Jr.,** will replace Beebe.

Dr. Ionel I. Gardescu, specialist in petroleum and natural-gas reservoir problems, recently joined the staff of **Ralph E. Davis,** petroleum and natural-gas engineering consultant, in the Houston office.

Paul E. Hadlick, Minneapolis, has been appointed special counsel for the Senate small-business subcommittee on oil, under chairmanship of Sen. Kenneth S. Wherry.

Walt Blanks, with the Chemical Process Co. in Seminole, has been transferred to Borger, Texas, as division superintendent.

Dr. Ernest H. Volwiler, executive vice president, Abott Laboratories, will be presented the honor scroll of the American Institute of Chemists on October 10, at Chicago, Ill., for his outstanding work in the organization of research programs and furthering of scientific societies.

E. S. Barrow, Southeast Texas district sales manager for the past 16 years with Humble Oil & Refining Co., has been transferred to the Houston office. Barrow will be replaced by **C. C. Scott.**

Donald R. Waugh has been appointed field representative for the petroleum industry's public-relations program in New England. **R. R. Potts** of Socony-Vacuum Oil Co. is chairman of that district committee.

E. G. Cole has been transferred from New York to Fort Worth as chief geologist of the Texas-New Mexico division of Sinclair Prairie Oil Co. He succeeds **H. Smith Clark,** who resigned to open consultant offices in Fort Worth.

SHIFTS—

P. O. Wood, superintendent, Texas Gulf Producing Co., Mont Belview, Tex., to Gueydan, La.; **Charles R. Burney,** engineer, J. S. Abercrombie Co., Raymondville to West Columbia, Tex.; **Richard H. Denman,** engineer, Stanolind Oil & Gas Co., Alvin, Tex., to Hackberry, La.; **W. R. Thurston,** geologist, Sun Oil Co., Corpus Christi to Dallas; **J. Curtis McCarthy,** engineer, Stanolind Oil & Gas Co., Fort Worth to Tulsa.

Paul Hunter, superintendent, Noranda Oil Co., Houston to San Antonio; **T. M. Curtis,** engineer, Stanolind Oil & Gas Co., Odessa to Midland, Tex.; **Pat E. Fletcher,** superintendent, Atlantic Refining Co., Odessa, Tex., to Great Bend, Kans.; **W. A. Bell,** foreman, Gulf Oil Corp., Pampa to Breckenridge, Tex.; **E. H. Blackaller,** engineer, Stanolind Oil & Gas Co., Pampa to Fort Worth; **R. E. Mitchell,** engineer, Shell Oil Co., Inc., Pampa, Tex., to Magnolia, Ark.

C. P. Stanley, engineer, Phillips Petroleum Co., Phillips, Tex., to Oklahoma City; **P. T. McGrath,** engineer, The Texas Co., Sundown to Penwell, Tex.; **George E. Trimble,** engineer, The Texas Co., Wichita Falls, Tex., to Jal, N. M.; **Charles M. French,** engineer, Standard Oil Co. of California, Berkeley to El Cerrito, Calif.; **Quentin Quick,** chemist, Magnolia Petroleum Co., Artesia to Tatum, N. M.; **Lawrence W. Coldren,** superintendent, Pure Oil Co., Minden, La., to Lufkin, Tex.; **G. D. Goodwin,** superintendent, Union Producing Co., Waterproof to Vivian, La.

Raymond B. Kelley, Jr., engineer, Humble Oil & Refining Co., Harvey, La., to New Orleans; **A. J. Rogers,** geologist, Skelly Oil Co., Bay Springs, Miss., to Lewisville, Ark.; **J. Brent Malin,** engineer, The Texas Co., Beacon, N. Y., to Montebello, Calif.; **Charlie L. Peterson,** engineer, Magnolia Pipe Line Co., Fort Recovery, Ohio, to Foreman, Ark.; **Vaughn A. Knight,** superintendent, Barnsdall Oil Co., Burrton, Kans., to Jennings, La.; **J. R. Ramsey,** engineer, Stanolind Oil & Gas Co., Ellinwood to Zenith, Kans.; **James P. Egan,** engineer, Union Oil Co. of California, Cut Bank to Shelby, Mont.

J. H. McKeever, geologist, California Standard Co., Aberdeen, S. D., to Sylvan Lake, Alta.; **Gene E. Petty,** engineer, Champlin Refining Co., Breckinridge to Borger, Tex.; **Henry L. Waszkowski,** engineer, Magnolia Petroleum Co., Healdton, Okla., to Oklahoma City; **George T. Crisman,** engineer, Magnolia Pipe Line Co., Marlow to Duncan, Okla.; **T. B. Whitson,** superintendent, Helmerich & Payne, Inc., Marlow to Wellston, Okla.; **Neal Clayton,** geologist, Republic Exploration Co., Wewoka to Ponca City, Okla.; **Dale V. Hammond,** engineer, Phillips Petroleum Co., Bartlesville, Okla., to Old Ocean, Tex.; **D. D. Moore,** geologist, Seismic Exploration, Inc., Shawnee to Cordell, Okla.

DEATHS

Andrew A. Kramer, 82, founder and president of Columbian Steel Tank Co., largest individually owned industry in Kansas City, died August 4 in Kansas City. He was also president of Steel Manufacturing & Warehouse Co., and owner of Kansas City Barrel & Package Co. Kramer was an inventor in his own right, having more than 250 patents recorded.

John Hervey Ross, 70, formerly associated with Standard Oil Co. (N. J.) in New York, died August 2 in New York. Ross joined Jersey Standard in 1919 and after 6 years in China returned to the United States and became affiliated with Oil Transfer Corp. in New York.

E. L. Martin, 63, Oklahoma City oil man and owner of properties in western Oklahoma and Texas, died August 6 in Billings, Mont.

Don Davis, 48, vice president of York & Harper, Inc., independent oil firm, died August 7 in Midland. Davis also was associated with J. P. Gibbins, Inc., oil-well servicing firm, and was a former member of the Midland City Council.

Henry Grattan Flood, 52, assistant manager of the marketing-engineering department of Shell Oil Co., Inc., New York, in charge of construction and maintenance, died recently in Albany, N. Y.

Wilson K. Page, 62, president and general manager of Olean Petroleum Co., Olean, N. Y., died August 6 at Salina, Kans.

Frank D. Campbell, former Henryetta, Okla., resident and retired chief engineer for Texas Pipe Line Co., died August 4 in Tulsa.

Harry Fowle, Sr., pipe-line superintendent for The Texas Co., died August 5 in Beaumont, Tex., of injuries sustained in an automobile accident.

William Wailes Dashiell, 91, founder of New York Lubricating Oil Co., died August 2 in Stamford, Conn.

Frank D. Reilly, 41, president of Bennett Drilling Co., Tulsa, died August 8 in a Tulsa hospital.

Charley T. Byars, 62, veteran Oklahoma oil lease broker, died August 10 in Chickasha, Okla.

H. A. Haltiwanger, manager of the land and lease department of Derby Oil Co., died recently in Wichita, Kans.

New Brunswick Field Development Planned

WITH an aim toward stepping up current oil and gas production in Canada's Stony Creek field, 10 miles from Moncton, N. B., a group jointly financed by United States and Canadian capital has purchased New Brunswick Gas & Oilfields, Ltd., and renamed the firm New Brunswick Oilfields, Ltd.

E. Holley Poe & Associates will be management advisor for the firm with Hilding Carlson, an associate of Poe's, actively engaged at Stony Creek. Poe is on the board of directors of this easternmost gas and oil-producing property on the North American continent.

Stony Creek has been producing oil and gas on a small scale since 1912. The average annual gas production has been 650,000,000 cu. ft. Total oil output to the end of 1946 amounted to only 390,000 bbl. Crude-oil production last year totaled 28,500 bbl. A total of 148 tests have been drilled with about 87 now producing oil and gas.

The new management plans to utilize the most modern producing and exploratory equipment in its all-out search for more oil and gas reserves. Considerable geological work has already been accomplished by Russell S. Tarr, associated with Poe, who has made recommendations for exploratory work in new areas. The principal local interest in gas has been evidenced by Moncton Electricity & Gas Co., Ltd. Interested in the oil production is nation-wide in that Canada produces less than 10 per cent of its demand.

The company franchise covers 6,500,000 acres. Of this total, Shell Explorations New Brunswick, Ltd., a newly formed subsidiary of Shell Oil Co. of Canada, Ltd., has been granted exploration rights. Shell's Dr. W. C. Gussow is the chief geologist for this project, and the company has 10 exploratory parties in the field.

New Brunswick Oilfields has retained all of the area within Hillsborough Parish which comprises about 120 sq. miles. Other oil producers are expected to seek exploration rights.

I.P.A.A. Will Discuss Shortages, Problems

Problems of independent oil and gas operators, with emphasis on the shortage of steel, will be discussed at the eighteenth annual meeting of the Independent Petroleum Association of America September 29 and 30 in Oklahoma City.

The meeting will consider all problems of the industry that have arisen with the unexpected demand for crude oil and petroleum products and have hampered the drilling of many Oklahoma exploratory wells, and even retarded the development of proven fields.

Other subjects will include: secondary-recovery operations, the part played by the Federal Power Commission in the control of oil production, regulation of leases on public lands, oil investigations by congressional committees, the Tidelands decision and the Anglo-American oil agreement.

One thousand delegates are expected to attend. Merle Becker is chairman of the program committee and Frank Buttram, former president of I.P.A.A., is chairman of the committee on arrangements.

Shea Succeeds Webb as Ethyl Corp. President

Edward L. Shea has been elected president of Ethyl Corp. to succeed Earle W. Webb, who becomes chairman of the board. Webb has been president since organization of the corporation in 1924.

Shea formerly was president of Tide Water Associated Oil Co. and president of North American Co. He is a director of the American Petroleum Institute.

Western Canada's Oil Regulations Changed

The petroleum and natural-gas act lifting the general reserve covering the entire area of British Columbia, western Canada, has been placed in effect by the government.

Previously, anyone staking out an area for exploration purposes anywhere in British Columbia was required to stake out an equal area for the government. Under the new act, the requirement will apply only to a special reserve district in the Lone Mountain area. The district falls between 54 and 56 degrees north latitude and 120 and 122 degrees west longitude.

Wartime Research Reports Are Available to Public

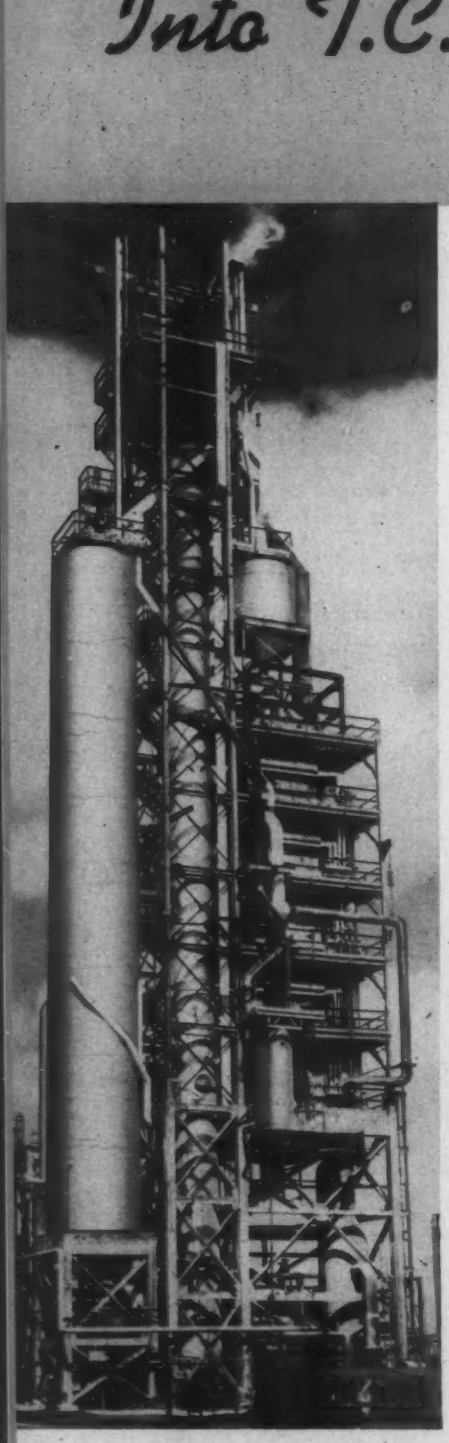
Approximately 2,500 reports of research on wartime technical problems, no longer held confidential, are now available to the public, according to a bibliography and index published by the Office of Technical Services, Department of Commerce.

The reports, sponsored by the Office of Scientific Research and Development, were edited by W. Kenneth Lowry, head of O. T. S. Reference Service Section.

Although the research projects were related to specific wartime needs, much of the material will prove of value to private industry, Lowry said.

Thermal Cracker Expanded Into T.C.C. Unit at Leonard Refineries, Inc.

by Arch L. Foster



The Leonard Refineries, Inc., T.C.C. unit, first postwar small-scale catalytic cracker

NEVER has any process development been watched with such avid interest as that of the application of the catalytic cracking principle to refining units of relatively small capacity. Consequently, the building and operation of the "small" T.C.C. unit at the No. 1 plant of Leonard Refineries, Inc., Alma., Mich., has been the focal point of all refiners' eyes since it started last March 18, operating on two typical Michigan crudes, to produce motor fuels of higher yields and octane number than are made by older processes, and other products as will be discussed later.

Designed and licensed by Houdry Process Corp., and built by Catalytic Construction Co., this unit was developed from a conventional, two-coil thermal cracking unit which had been in operation for some time, and the achievement shows, its designers say, how easily existing thermal units can be converted to modern T.C.C. catalytic cracking plants. In the accompanying flow chart the items shown within the dotted line rectangle are the only new items of equipment required to adapt the thermal cracking unit to T.C.C. operation, the others being taken directly from the old unit and included in the new, with some slight modification in some cases. Consequently, the total cost of this unit, over all, is in the range of $250 per barrel of daily throughput capacity, Reid Brazell, Leonard's president, states.

The unit is designed to crack about 3,000 bbl. per day of heavy gas oil from Michigan crudes, to produce motor fuel up to approximately 50 per cent yield, along with other products. Since it started operations it has been experimented with over a wide range of charge stocks, throughputs, operating conditions, and yields, to determine its flexibility, range, and possibilities. It has handled as high as 5,000 bbl. of stock per day with good yields of motor fuel, and with still "room to go" in the matter of catalyst regeneration, that is, in carbon-burning capacity, which is often the "bottleneck" in a catalytic cracking unit. Designed for circulating either clay or synthetic catalyst, pelleted clay is currently being used.

The principal items of equipment in the Leonard T.C.C. unit design are the reactor-catalyst hopper-storage vessel; the split-bucket, single-conveyor catalyst elevator; the seven-zone kiln or catalyst regenerator; an air blower; the elutriator or catalyst-cleanup system; and the auxiliary catalyst cooler-stream generator system. The feed-preparation unit is not included in this phase of the description, since it is typical and found in all installations, although differing in each process unit, as the specific situation may require.

Catalyst Flow Control

The T.C.C. reactor is the most important section of the three-section tower in which it forms the lowest division. Above the reactor in the 12-ft.-diameter vessel but in the same shell are located the hot-catalyst storage bin and the reactor feed hopper. The latter provides "surge" capacity for the regenerated catalyst entering the reactor. A unique indicating level controller situated atop the feed hopper regulates the catalyst flow from the bottom of the reactor by throttling the "chopper" valves which control the outflow. To avoid any possibility of the catalyst backing up to the elevator and flooding the shaft, two 10-in. overflow pipes extend from near the top of the hopper to the hot-catalyst storage bin located immediately below the feed hopper. Thus, should the hopper become full, the catalyst automatically spills over into the storage compartment.

Directly from the main catalyst hopper (not the hot-catalyst storage bin), regenerated catalyst flows through a 16-in. seal leg, 49 ft. long, downward into the top of the reactor section. Back pressure in the reactor is maintained normally at 6-8 psig. and, should this pressure against the downflowing catalyst exceed 12 psig. the slide valve at the top of the seal

leg is closed automatically to prevent back flow of vapors into the hopper.

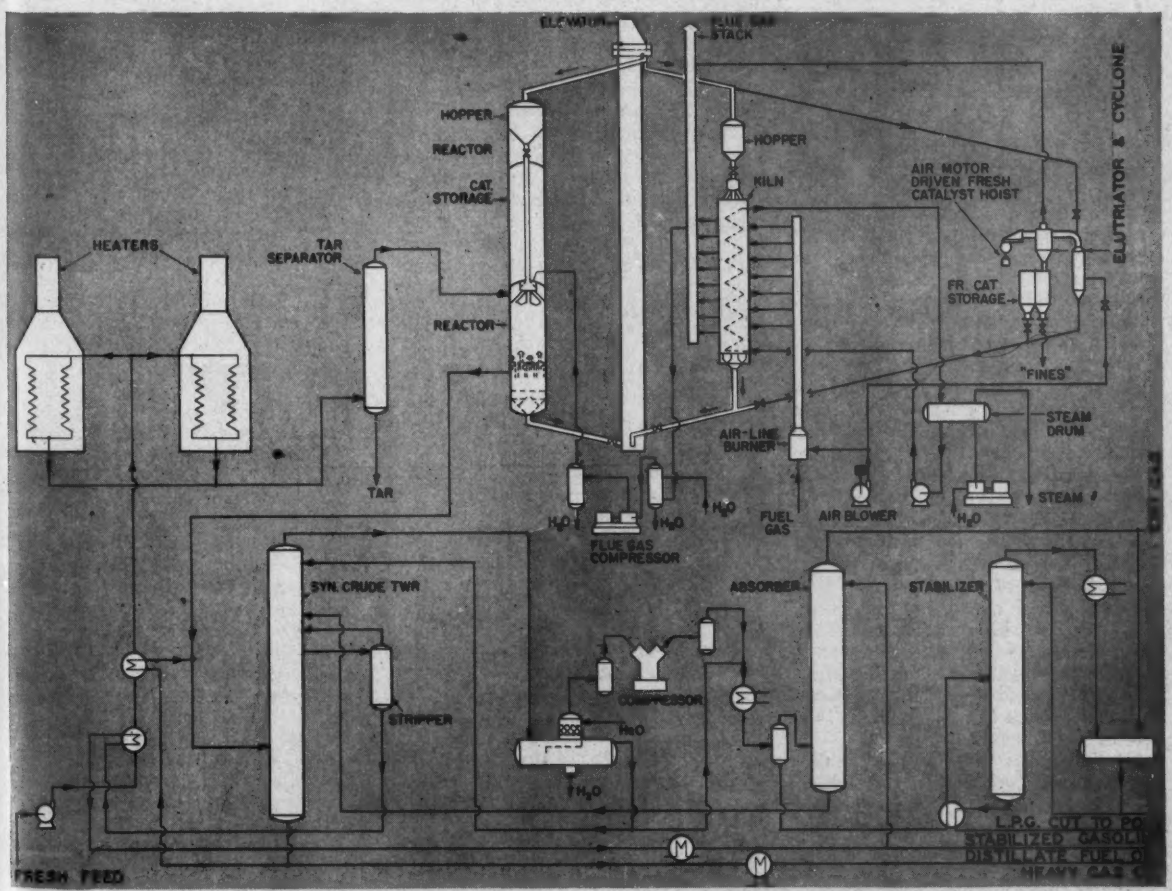
Regenerated catalyst from the bottom of the seal leg enters the distributor system which spreads it evenly over the top of the reactor bed. The distributor device consists of a cone with the apex at the top, over the side of which catalyst flows to an annular plate or tube sheet in which the ends of eighteen 3-in. diameter tubes are mounted and extend downward to a point which fixes the top of the reactor catalyst bed. By regulating the length of these tubes the depth of the reactor bed can be varied from a depth of 5 to 15 ft.

The vaporized charge stock enters the reactor above the catalyst bed and passes concurrently with the catalyst down the reactor. At the bottom of the bed the catalyst and cracked hydrocarbons are separated after pasing through the 2½-in. square nipples in the disengager baffle, the vapors selectively flowing through the vapor downcomers to the level where they are withdrawn from the reactor. Three-inch pipes carry the spent catalyst to the catalyst drawoff section which is made up of three perforated plates. The top plate has three discontinuous 4-in.-wide slots located concentrically through which the catalyst passes. These slots extend their walls 6 in. below the lower face of the top plates. The other two plates have staggered rows of 3-in. holes. The spent catalyst passes through a 12-in. nozzle at the bottom of the reactor into the catalyst line extending to the point where the line splits just before entering the bottom of the elevator, the outflow from the reactor being controlled by a pair of chopper valves which admit spent catalyst into the ascending elevator buckets.

To prevent hydrocarbon vapors from resurging from the reaction chamber back through the catalyst distributor pipes and into the seal leg, the catalyst distributor is pressured with inert gas to approximately 10 in. of water over the pressure at the top of the reactor. For this service either steam or flue gas may be employed as the inert material, the flue gas being obtained from either a furnace stack or the kiln. When steam is used as a sealing medium, the catalyst is prehydrated to nearly 100 per cent saturation before it enters seal leg by the injection of steam into the regenerated catalyst hopper. Flow of hydrocarbons from the bottom of the reactor to the elevator is similarly prevented by injection of purge steam below the first drawoff baffle.

Catalyst Elevator and Kiln

The catalyst elevator shaft is 6 ft. in diameter and 153 ft. high. suspended entirely from the top of the steel-and-concrete framework, and free of any support at the bottom. It is connected to the spent-catalyst and regenerated-catalyst inlet lines by flat steel sheets which allow for the expansion and contraction of the housing under the temperature changes which prevail between the atmospheric temperature and that inside the elevator. Driven by a 40-hp. electric motor through a reducing gear is a double-chain bucket conveyor extending from the top to the bottom of the elevator. Linked chain passes on traction wheels fitted onto a single shaft at the top and to each opposed pair of links in this chain a three-compartment bucket is attached rigidly, which ascends with its open end upward, inverting at the top to discharge its catalyst contents into the downflow pipes. At each end of the bucket is a compartment comprising one-fourth of the total volume



Flow chart of the Thermofor catalytic cracking unit at Leonard Refineries, Inc., Plant No. 1, Alma, Mich. Units which are new to the assembly are at upper right; the remainder of the items were taken from the older thermal cracking unit

Design of the elutriator, or catalyst-cleanup unit. Simple in design and in operation, its control is positive and effective, say its operators, requiring a minimum of attention

of the bucket, each outer section being separated from the large center section by a baffle or wall.

Spent catalyst from the reactor enters these end compartments of the elevator buckets while regenerated catalyst from the kiln is carried in the large center compartment. This utilization of a single elevator contributes much to the simplification of the T.C.C. unit's design and constitutes one of the main differences between the small postwar units and the large units built during the war which employed two elevators, entirely separate in operation.

The spent-catalyst line from the reactor splits and directs spent catalyst into two streams, each feeding one of the aforementioned outer compartments of the elevator. The chopper valves controlling this outflow from the reactor to the elevator being air operated. A similar chopper valve in the regenerated-catalyst line from the kiln controls the discharge from that vessel into the middle section of the buckets.

At the top of the elevator this bucket-loading process is reversed. A split line for the spent catalyst is located immediately below the top level of the elevator; the wider edge of the compartment baffles prevents mixing of spent and regenerated catalyst. The spent-catalyst receiving lines unite and lead one stream of catalyst to the feed hopper atop the kiln. An entirely separate line receives the regenerated catalyst from the middle compartment and conveys it by gravity to the reactor hopper.

The kiln, a vessel 10 ft. by 10 ft. 6 in. in cross section by 58 ft. high, is fitted with seven regeneration zones for burning the coke laid down on the catalyst during the cracking reaction. Spent catalyst passes from the hopper above the kiln to a distributor unit consisting of sixteen 4-in.-diameter pipe which convey proportionate amounts of catalyst uniformly over the top of the first burning zone. The zones are each provided with cooling coils, air inlet channels near the vertical center of the zone, and alternating with the air inlets are flue-gas outlet or collector channels which convey the regeneration gases to the stack.

Air up to 15,000 standard cubic feet per minute is supplied for regeneration by a centrifugal blower operating at approximately 1½ psig., and by using the so-called air-line burners, the temperature of the air can be varied from atmospheric temperature to 600° F. as desired by the operator. The temperature of the catalyst during regeneration is controlled by the number of rows of cooling coils placed in service, thus permitting the operator to maintain the regeneration temperature within desired bounds to avoid damage to the catalyst or the kiln. The coils of 2⅜-in. o.d. follow the general pattern of a heat exchanger, usually with two or three rows in service in each zone, depending upon the location. A disengaging drum is provided at the first level in the structure, into which the steam and water from the kiln flows, and from the top of which 300-lb. steam is withdrawn, the unvaporized water returning to the kiln cooling coils through the water-circulation pump.

A central horizontal hollow beam with 14 ports in each vertical side wall conveys air to each zone. Channels at each port extend to the kiln

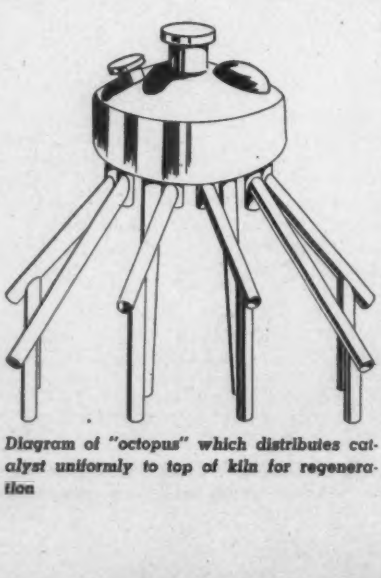
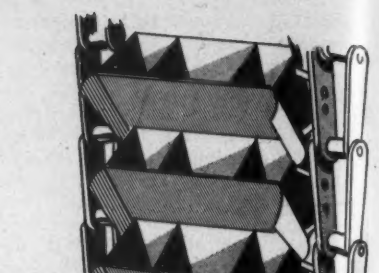


Diagram of "octopus" which distributes catalyst uniformly to top of kiln for regeneration



Sketch of divided buckets and catalyst chutes. Upper chute conveys regenerated catalyst to center compartments. Lower chute which is split into the form of a "Y" delivers spent catalyst to the bucket compartments on each side

wall and aid in distributing the air uniformly. Similar channel units in each zone collect spent air—flue gas—and remove it from the kiln. In the lowest or seventh zone two banks of cooling coils are provided, one just above the inlet and one just below the lowest flue-gas collector unit, to give additional flexibility to the regeneration-cooling system.

Materials Employed

While alloys are employed in several places in the unit, all are low, mostly 1¼ to 4-6 per cent chrome. The shell of the reactor-tower assembly is carbon steel; the catalyst-storage section, and the hopper, above, are of 7/16-in. sheet, insulated outside with material of the "85 per cent magnesia" type, with no insulation or lining inside. The reactor proper, the lower part of this section, is of ⅞-in. carbon steel sheet. The 18 catalyst distributor pipes at the top of the reactor are of seamless carbon steel and in the catalyst draw-off section, all plate is carbon steel.

In the kiln (regenerator) are 32 separate temperature points for indicating, not control; also 8 primary flue-gas outlet temperature points are installed, also for indication of prevailing conditions rather than control. The internal insulation lining of the kiln is Quigley Panelag, refractory material which has a relatively thin hardened surface on the inside to withstand the abrasion of the downward-passing catalyst, and a less dense "heart" for heat insulation. The distributor of the kiln top has 16 carbon steel pipes which spread the catalyst evenly over the top of the kiln. Gaskets in this setup are of J-M "C" stock asbestos millboard.

The grid beams which admit regeneration air and exhaust the flue gas

respectively, are Sicromo 5S or equivalent; 5 per cent chrome, ½ per cent molybdenum, 1½ per cent silicon. The inlet and outlet channels are of the same material. The cooling coils in which water is used to cool the catalyst and gases, are 1¼ per cent chrome, ½ per cent molybdenum, ¾ per cent silicon, with carbon steel return bends.

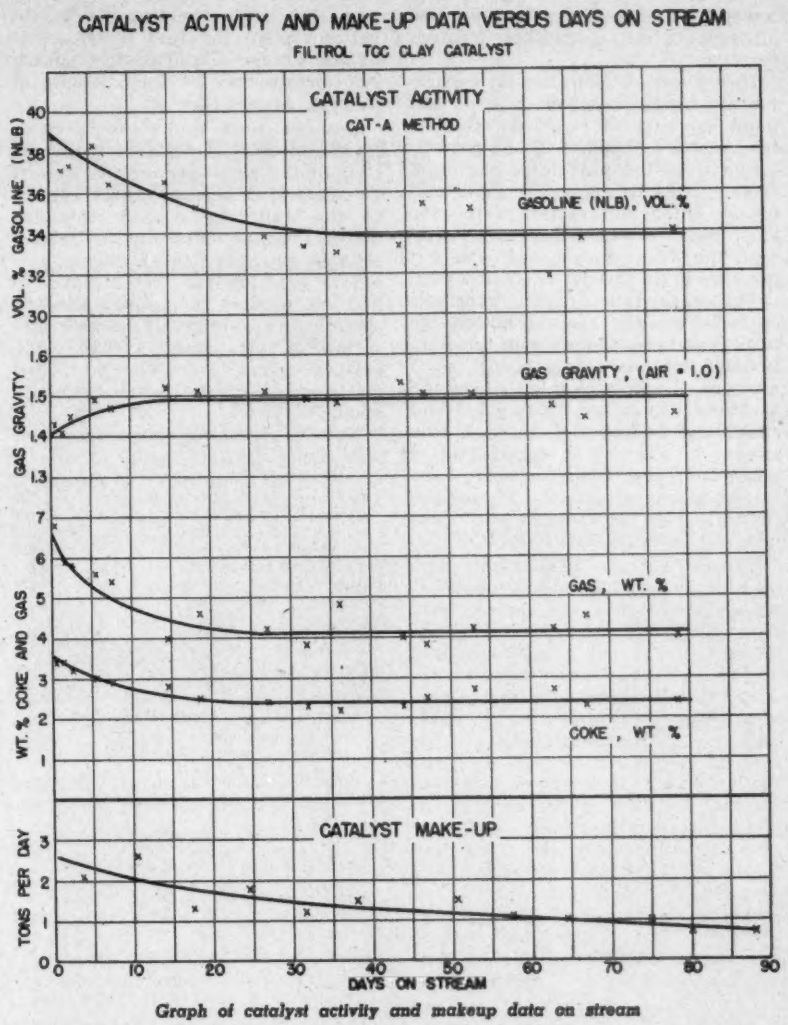
The elevator housing and buckets are of plain carbon steel, and the chain is 1¼ per cent Cr (Croloy).

Catalyst Cleanup—The Elutriator

For eliminating fines from the catalyst, which are formed by abrasion in passing through the system, a bypass line leads from the regenerated catalyst line on its way to the reactor feed hopper to the elutriator unit, an enlarged pipe for countercurrent contact of catalyst and air. An air-inlet nozzle is provided, hot air flowing radially to meet the down-falling catalyst stream. The lighter, smaller particles are caught in this stream of air and are carried upward and out of the cyclone, where the fines are separated from the air, falling into a down line to a discard receptacle; the spent air is vented at the top of the cyclone. The size of the particles removed is determined by the rate of air flow. In practice on this unit the operation is set for 95 per cent or more of the elutriated catalyst to be held on a 10-mesh screen.

Further saving in cost of the unit has been instituted by providing a simple barometric condenser, or direct water-contact unit instead of the conventional shell-and-tube exchanger for condensing the overhead of the synthetic-crude tower, the main fractionator. The contact is made in a short 42-in.-diameter section in which water flows downward countercurrent to the ascending overhead vapors from the fractionator. A horizontal drum, 10 ft. in diameter and 40 ft. long, serves as a liquid receiver and a water-gasoline separator, in which separate level controls maintain sufficient gasoline for reflux and at the same time direct portions of the separated condenser water to other uses.

A gas compressor handles the light gases from the gas-and-water separator. A complete system of alarms and safeguards is provided to avoid serious trouble or damage to the compressor and its auxiliaries. An alarm gives warning of high liquid levels which might send liquid into the compressor suction. A Magnetrol switch grounds the magnetos of the gas engine driving the compressor if the liquid level continues to rise after the warning. The gas-water separator is protected against too high a pressure or vacuum by a 12-in. water seal leg on the tank. The gas compressor is operated at constant speed by means of a 4-in. line



Graph of catalyst activity and makeup data on stream

between the main separator and the secondary separator on the compressor discharge line, which 4-in. line is fitted with a control valve which opens on low pressure and closes on high pressure.

The rate of catalyst circulation is determined by calibration of the power consumption of the elevator motor against catalyst circulated, and from this curve the actual circulation is controlled.

Temperatures in the kiln are controlled essentially as follows: In cooling zones, temperatures range from 800° F. in the first zone to 950° F. in the last four zones; in burning zones, the temperatures range from 900° F. in Zone 1 to 1,050° F. in the last four zones.

Typical Operating Details

In a typical operation of this unit as carried out during the testing and breakin period, a mixture of, usually, 50 per cent each of Reed City, a relatively light Michigan crude, and of Adams, a heavier crude, is pumped through heat exchangers to the topping unit where light gasoline, heavy naphtha reforming stock, kerosine, a distillate fraction, and a diesel-fuel fraction are removed. This operation removes about 50 per cent of the Adams crude and 65 per cent of the Reed City charge. The crude fractionator is operated to minimize as much as possible the amount of straight-run gasoline included in the bottoms, since this material after flashing in the tar separator constitutes the feed to the catalytic section. The reduced crude is sent through two Unaflow heaters—formerly furnaces for the Dubbs thermal cracking unit—and is flashed in the tar separator, formerly the flash chamber of the thermal unit; steam is admitted to the heater coils and into the tar separator to aid in stripping out the tar as completely as possible. This operation results in approximately 80 per cent of the Reed City and 65 per cent of the Adams crude passing overhead to the reactor as charge. The tar passes to a vacuum tower to remove the last traces of distillate material, with steam only as source of additional heat. The bottoms from the vacuum

tower are used as heavy fuel oil, road oil, asphalt, etc., as market demands require.

Heavy gas oil from the tar separator as overhead, which has an end point up to 1,000°-1,100° F., goes to the reactor as vapor without condensation from the top of the tar separator. The tar-separator overhead vapors enter the reactor at the top and pass downward concurrently with the 8-ft. catalyst bed. The net pressure in the reactor is about 5 psig.

The cracked vapors, or "synthetic crude" from the reactor bottom go to the fractionator, formerly the fractionator for the thermal unit, at a pressure of around 4 psig., where the overhead vapors are fractionated and cut to the desired end point. A side stream of gas oil or recycle oil is taken from the tower to be returned to the flash chamber and to the reactor, or to be eliminated as furnace or other distillate fuel oil.

Vapors from the fractionator overhead enter the barometric-type condenser where they are brought into direct contact with water, the entire mixed liquid stream going below into the 10 by 40-ft. storage accumulator. Water is withdrawn from the bottom of this drum, gasoline from the middle or upper liquid layer; vapor from above the liquid is taken to the suction of the compressors, raised to 70 psig. and sent to the absorber in the vapor-recovery system. The gasoline has been cut to end point, and is practically sulfur free. The overhead from the stabilizer of the recovery system is used for liquefied petroleum gas, propane and butane being made separately. This is done by depropanizing the overhead vapors to yield propane, while the bottoms from the first tower go to butane storage. The main fractionator side stream may be used, wholly or in part, as absorber oil.

Bottoms from the synthetic-crude fractionator are circulated to supply heat to the stabilizer reboiler and to preheat the reduced crude charge to the unit, the cooled circulated bottoms finally entering the reactor effluent transfer line as quench just before entering the tower. The net bottoms product is pumped through a cooler to storage. It is greenish-yellow in color, about 19°-20° A.P.I. gravity, and is clean. The No. 2 fuel oil from the crude unit is normally about 32° A.P.I.

Normal operating conditions are, approximately:

	Degree F.
Reactor charge temperature	830
Catalyst to reactor	1,000
Vapors out of reactor	880
Catalyst out of reactor	880
Quenched vapors into synthetic-crude tower	680
Synthetic-crude tower overhead vapors	255
Synthetic-crude tower bottoms	550
Outlet air from burner	400- 600
Flue gas from kiln	950-1,000
Vapor inlet pressure, T.C.C. reactor, psig.	6-8
Reactor purge stream, lb./hr.	2,400
Catalyst to reactor, tons/hr.	75

Yields on once-through operation with clay catalyst are, approximately:

L.P.G., C_3, wt. per cent	9.9
C_4, excess, vol. per cent	10.6
Motor gasoline, 10 lb. R.v.p., vol. per cent	47.0
Side stream (No. 2 distillate), vol per cent	24.7
Bottoms, vol. per cent	14.0
Coke, 1,600 lb./hr., wt. per cent	4.7

Of course the volume per cent results do not balance with the charge volume. Steam is made in the regenerator at the rate of 17,000 lb. per hour, at 300 psig.

Test runs on recycling operation indicate that the regenerator has a coke burning capacity well above 3,000 lb. per hour for which it was designed; on this basis it is believed that 6,500 bbl. of charge per day may be cracked in the unit, to give gasoline and other yields which will be normal for an operation of this kind. Recycling yield data are not yet conclusive but conversions between 65 and 70 per cent appear to be attainable, John S. Pfarr, Leonard's vice president of refining, states.

Inspections and properties of charge stocks and products are shown in Table 1.

These data are taken as stream samples to show qualities being produced during experimental runs of the unit for the period when operating conditions were being changed frequently to explore the unit's possibilities. Note that the octane ratings of gasoline from both crudes are identical, showing uniformity of operation for finished product. Copper dish gum for gasoline from Adams crude, the heavier crude, is 2½ times as high as that from Reed City crude but all of the gasoline easily passing all gum specifications. Sulfur in the reduced crudes is fairly high, but in the gasoline falls to 0.046 and 0.081 for 100 per cent Reed City and 100 per cent Adams crude operations respectively. Distillates, or catalytically cracked fuel oil, show low carbon residue, 0.08 and 013, and middle diesel indices, 46.6 and 39.8 respectively.

TABLE 1—*TYPICAL TESTS—T.C.C. CHARGE AND PRODUCTS

	Reed City						Adams					
	Rd. Cr.	TSB	TSO	Gaso.	Dist.	STB	Rd. Cr.	TSB	TSO	Gaso.	Dist.	STB
Gravity, °A.P.I.	28.5	15.2	31.8	62.7	32	24.0	18.9	11.1	28.0	61.4	30	19.0
Color	Green	Black	5	30+	1	4½	Black	Black	7	27	2	4½
Pour, °F.	+30	+35	....	....	0	+60	+5	+60	....	....	0	+50
Dist., A.S.T.M.:												
I.b.p., °F.	446	....	....	96	442	478	485	....	....	90	435	470
10 Per cent Rec. at °F.	575	....	....	118	472	568	610	....	....	114	492	570
20 Per cent Rec. at °F.	625	....	....	132	478	586	650	....	....	141	500	590
30 Per cent Rec. at °F.	660	....	....	150	482	608	(‡)	....	....	163	510	602
40 Per cent Rec. at °F.	(†)	....	....	176	486	628	....	....	....	183	515	616
50 Per cent Rec. at °F.	....	....	....	208	494	640	....	....	....	208	520	628
60 Per cent Rec. at °F.	....	....	....	240	500	658	....	....	....	233	530	640
70 Per cent Rec. at °F.	....	....	....	280	510	678	....	....	....	268	540	652
80 Per cent Rec. at °F.	....	....	....	320	520	738	....	....	....	312	555	680
90 Per cent Rec. at °F.	....	....	....	362	540	740	....	....	....	359	576	706
E.p., °F.	....	....	....	402	584	760	....	....	....	390	630	728
Octane, A.S.T.M.	....	....	....	78	....	....	....	....	....	78	....	....
Octane, Research	....	....	....	87	....	....	....	....	....	87	....	....
Gum, A.S.T.M., mg./100 ml.	....	....	....	1.8	....	....	....	....	....	2.2	....	....
Gum, Cu. Dish, mg./100 ml.	....	....	....	5.4	....	....	....	....	....	12.9	....	....
Induction period, hours	....	....	....	22+	....	....	....	....	....	22+	....	....
Sulfur, per cent weight	0.70	0.855	0.611	0.046	0.269	0.597	0.85	0.976	0.558	0.081	0.385	0.553
Carbon residue, per cent weight	1.5	8.6	0.22	....	0.014	0.14	8.0	12.9	1.17	....	0.01	0.14
Car. Res. on 10% Btms. % weight	....	....	....	....	0.08	2.65	....	....	....	....	0.13	2.10
Viscosity S.U. at 100° F. Sec.	200	....	....	....	34.8	53.0	1,000	....	....	....	34.7	50.8
Viscosity S.F. at 140° F. Sec.	..	221	....	....	....	....	....	450	....	....	....	....
Kinematic Visc. at 100° F. Centistokes	....	....	....	....	2.48	7.74	....	....	....	....	2.5	7.80
Flash, P. M., °F.	....	....	....	....	195	....	....	....	....	....	170	....
Flash, COC, °F.	230	370	....	....	....	250	295	470	....	....	....	270
Aniline Point, °F.	..	..	....	....	142	162	....	....	....	....	130	146
Diesel Index	....	....	....	....	46.6	39.6	....	....	....	....	39.8	31.4
Reid vapor pressure, psi.	....	....	....	10	....	....	....	....	....	10	....	....

*Operation of this T.C.C. unit has changed from day to day. These tests represent spot checks on stream samples from time to time and not a systematic program to obtain representative tests for a definite type of T.C.C. operation. Rd. Cr. = Reduced Crude; TSB = tar still bottoms; TSO = Tar Still Overhead; STB = Steamed Tar Bottoms. †Cracking at 37.5 per cent recovered. ‡Cracked at 21 per cent recovered.

Design of Low-Pressure

VAPOR-CONSERVATION TANKS

by Fred L. Plummer*

FIXED-VOLUME storage tanks which are vented to the atmosphere or are equipped with conservation vents which operate at very low vacuum and pressure settings are suitable for the storage of non-volatile liquids including such petroleum products as kerosine, heavy crudes, and certain fuel oils. If more volatile products such as motor and aviation gasoline are stored in such tanks, the daily expansion and contraction, due to changes in temperature of the volume of air-vapor mixture filling the tank above the liquid level, will result in a serious loss of the product and a drop in the performance characteristics of the remaining product. If still more volatile products such as natural gasolines which may boil at atmospheric temperatures and pressures, are stored in such tanks, the losses will become prohibitive.

Breathing losses and boiling losses from such tanks can be avoided if the tanks are designed and constructed so as safely to withstand a working pressure such that it becomes unnecessary to allow "breathing" under normal storage conditions.

Tanks designed to operate with pressure-relief valves set to open at the low pressure of 2½ psi. have been

*Director of engineering, Hammond Iron Works, Warren, Pa.

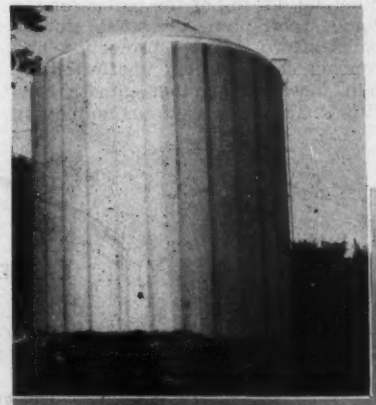


Fig. 3.—A 10,000-bbl. tank constructed for storage of natural gasoline recovered from natural gas for a Pennsylvania gas company

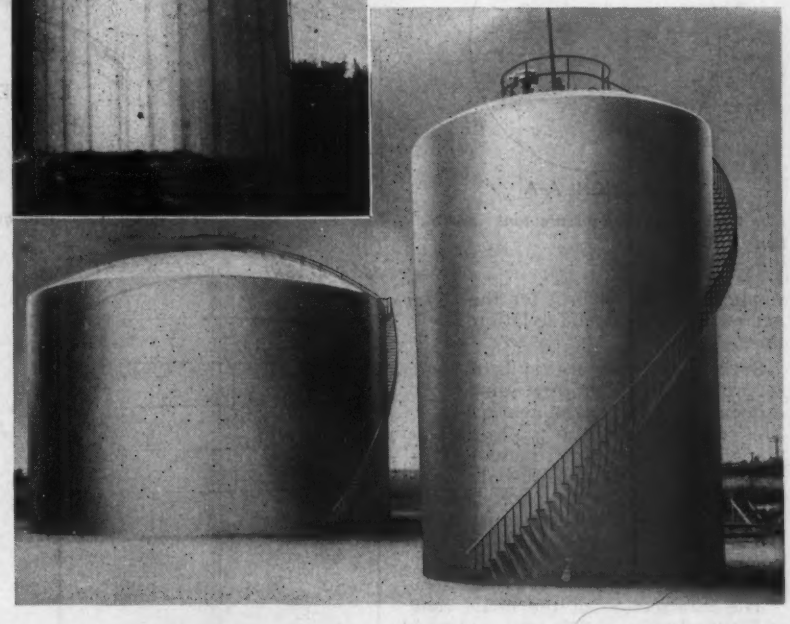


Fig. 2.—Two low-pressure tanks constructed at a bulk plant near Greensboro, N. C., designed to operate at 2½ psig.

Fig. 1.—Low-pressure storage tanks at a bulk station

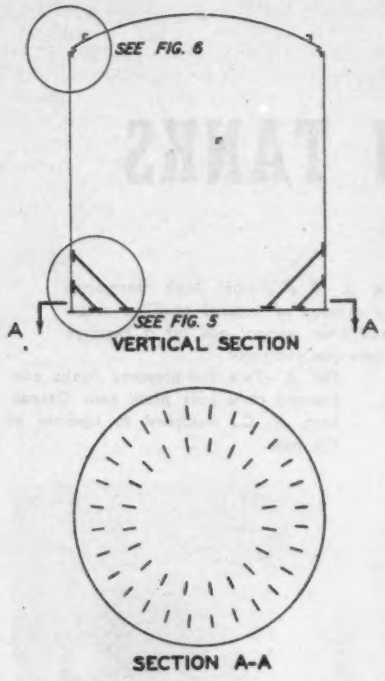


Fig. 4.—Typical low-pressure tank construction

found quite satisfactory for the storage of most motor and aviation gasolines.

Several low-pressure tanks of what is probably the simplest and most economical type* are shown in Fig. 1. This picture shows a typical bulk-plant installation which includes two 10,000-bbl. and three 6,800-bbl. tanks designed to operate at a gage working pressure of 2½ psi. These tanks have flat bottoms, cylindrical, shells, and dome roofs, with no internal roof supports.

The intersection of the dome roof and cylindrical shell is stiffened and reinforced by two angle rings (Figs. 4 and 6) which, together with the adjacent parts of the roof and shell plates, form a ring compression girder which prevents the tension forces in the roof plates from pulling the upper edge of the shell plates inward, causing excessive distortion at this intersection.

Diagonal ties (Figs. 4 and 5) are provided between the shell of the tank and the tank bottom in order to balance the uplift created in the tank shell and the downward pressure exerted on the bottom by any vapor pressure in the tank which exceeds atmospheric pressure.

*Patent applied for.

Economical Fabrication

Such tanks can be fabricated and erected in a very economical manner. No special shaping or other preparation of the foundation is required. Shop fabrication, similar to that for cone-roof tanks, requires only the most simple operations including the spherical dishing of the plates for the dome roof. Low-pressure storage tanks afford positive protection and dependable operation, unaffected by rain, snow, ice, or other climatic conditions. The tank itself has no moving parts or machinery. Therefore only normal maintenance is required and no operator is needed. An occasional inspection of the pressure-vacuum relief valves will insure continuous, trouble-free operation at full efficiency regardless of whether the tank is full or nearly empty.

Since less fresh air and oxygen are drawn into such tanks, less corrosion will result. Fire and explosion hazard will be much less since the rich vapor mixture will almost always be far above the explosive range.

Fig. 2 shows two low-pressure tanks constructed at a bulk plant near Greensboro, N. C. The larger

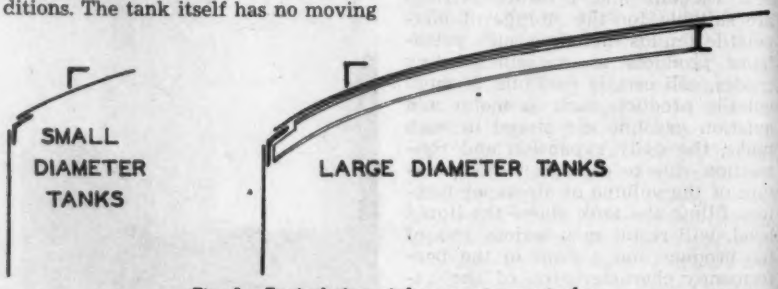


Fig. 6.—Typical ring girders on storage tanks

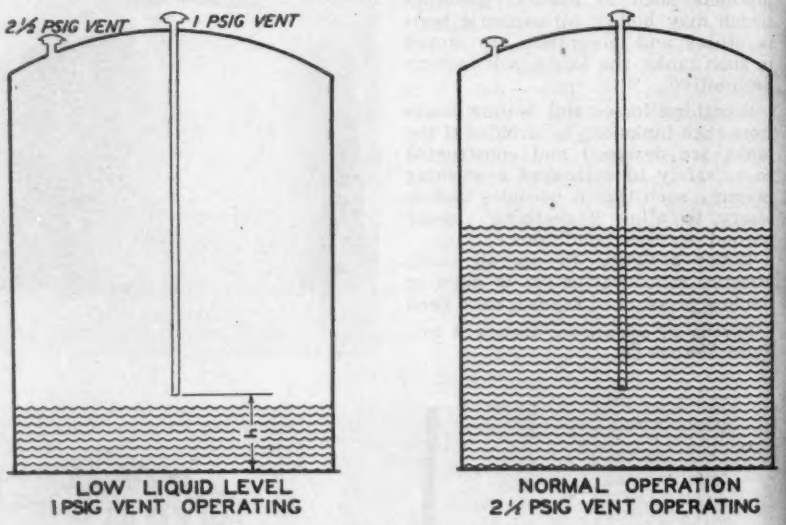


Fig. 7.—Operation of auxiliary relief unit

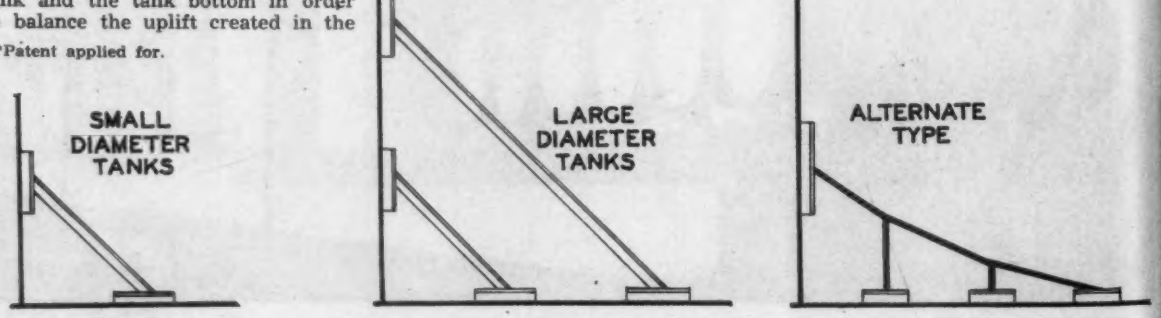


Fig. 5.—Typical bottom ties in storage tanks

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tank has a diameter of 70 ft. and is 40 ft. high with a liquid storage capacity of 27,500 bbl. Both tanks are designed to operate at a gage pressure of 2½ psi. Construction is the same as for the smaller tanks shown in Fig. 1 except that the dome of the large-diameter tank is stiffened by small radial beams (Fig. 6), extending from the shell to a ring girder having a diameter of 40 ft. For both tanks the second ring angle used with the shell-to-roof connection angle to form a compression ring girder, is placed below instead of on top of the roof plates.

In low-pressure tanks of this type having diameters greater than 60 to 70 ft., the use of an auxiliary relief unit* makes it possible to eliminate a portion of the shell-to-bottom bracing which is required if the tank is designed to resist the full working-pressure when there is no liquid in the tank. The auxiliary relief unit (Fig. 7) consists of a pipe extending from a point 5 or 6 ft. above the bottom of the tank through the roof of the tank where it is equipped with a pressure vent of the conventional type set to operate at about 1 psi. Thus when the liquid level in the tank drops below 5 or 6 ft. the working pressure in the tank is automatically reduced from 2½ psi. (or any other setting used for the auxiliary relief valve). Since it is common practice to maintain a reserve supply of product in all tanks at bulk stations and similar distribution points, the liquid level in such tanks will rarely drop below the levels noted above and the full design working pressure will be available under all normal operating conditions.

For small-diameter tanks the savings resulting from the use of such an auxiliary relief unit are generally not large enough to warrant its use, unless the tank is designed to operate at a relatively high working pressure. Fig. 3 shows a 10,000-bbl. tank constructed for the storage of a natural gasoline recovered from natural gas by a Pennsylvania gas company. It is designed to operate at a gage working pressure of 7½ psi. Comparative records of losses of the same product stored in this tank and in other fixed-volume containers of conventional types operating at much lower pressures, indicate that savings during 3 months of summer storage more than paid for the additional cost of this container over one of the cone-roof type having the same storage capacity.

Low-pressure storage vessels may be considered as including those vessels in which the vapor pressure, in addition to any liquid pressure, does not exceed 15 psi. and the construction is therefore not covered by the A.S.M.E. or the A.P.I.-A.S.M.E. Codes for Unfired Pressure Vessels. The design and construction of such low-pressure generally folow the rules of the A.P.I. Code 12-C governing the construction of all-welded oil-storage tanks except that more conservative working stresses are normally used. Tanks of the type shown in Figs. 1, 2, and 3 are usually constructed with a dome roof having a spherical radius equal to the tank diameter and a plate thickness of ¼ in. Bottom plates are 5/16 in. thick and the thickness of the shell plates is determined by the use of a basic working stress of 14,125 psi., a weld joint efficiency of 85 per cent, and an assumed weight for the liquid product of 48 lb. per cubic foot. The roof compression girder and the ties and stiffening beams are designed in accordance with A.I.S.C. specifications. However, tension stresses in the ties are usually kept under 10,000 psi. and bending stresses in stiffener beams less than 13,750 psi.

*Patent applied for.

Special-Shape Tanks

Special-shape low-pressure tanks such as spheroids, ellipsoids, torospheres, and cylindrical tanks with dished roofs and dished bottoms have also been widely used. The use of pressure tank shells in which the plates are curved with respect to both major axes at any point will in general result in a saving of plate material since stresses can be developed parallel to both axes which in an ideal case might equal the full allowable working stress for the plate material. In the shell of a cylinder vessel with closed ends, the unit stress in the longitudinal direction will equal only one-half that in the circumferential direction for uniform internal pressure. Moreover, the forces created at points of discontinuity as at the junction of roof and shell, and bottom and shell can be avoided. However, the saving in material may be more than offset by other factors. The dishing of steel plates to varying double curvatures is a relatively slow and expensive procedure requiring severe cold working of the plate material. Cost of assembly in the field, fitup, and welding may be much higher for such containers. The preparation of foundations for tanks having dished bottoms will be much more costly. Under normal operating conditions, as liquid level and gas pressure vary, unit stresses will fluctuate widely and the shape of certain types of containers may change appreciably. This may affect operating conditions such as the accurate gaging of the tank contents. The use of such special shape containers may, however, be economical for very large capacity low-pressure storage tanks. No important service failures of vessels of the type shown in Figs. 1, 2, and 3 have been reported.

Low-pressure tanks are usually constructed of relatively thin plates and are supported directly on the ground. Construction of manholes and nozzles involves the use of similar thin plates and small size welds. Thus most of the factors which may have contributed to the failure of certain vessels designed for much higher working pressures and supported on columns, are absent or are of less importance in the construction of these vessels. Many vessels of the types described above, designed and constructed for a working pressure of from 2½ to 5 psi., are being used by the petroleum industry for the storage of gasolines and other volatile petroleum products. In general, no analysis or design problems involving important unknown factors are encountered and it is therefore relatively easy to design tanks of this type of assured safety and economy.

Low-pressure tanks are designed to operate safely at pressures which will eliminate all breathing and boiling losses of the specific product to be stored. They will reduce filling losses and may almost eliminate them, depending upon the product stored, the settings of the relief valves, and the manner in which the tank is worked. The required working pressure depends upon the vapor pressure of the product at expected liquid surface temperatures and upon the daily variations in the temperature of the vapor space. The relationship may be expressed as

$$G = P - A + (A\text{-}P')\ T/T'$$

where

G = Required working pressure in psi.

A = Atmospheric pressure in psi. = 14.7.

P and P' = Vapor pressure of product at maximum and minimum liquid surface temperature in psia.

T and T' = Maximum and minimum absolute temperature in vapor space.

If the required working pressure exceeds 15 psi., it will usually be necessary to design and construct the storage vessel in accordance with the rules of the unfired pressure vessel codes of the A.S.M.E.-A.P.I. In such cases it will usually be found most economical to store the product in spheres or in horizontal or vertical cylindrical tanks with hemispherical ends.

Low-presure storage tanks are normally equipped with pressure-vacuum vents of adequate capacity set to operate at a low vacuum and at the desired working pressure. The usual in-and-out nozzles, shell and roof manholes, water drawoff connections, and suitable stairs and platforms are provided. A special gage and sampling hatch of a type suitable for operation on a pressure tank may be installed or a gage well with a manometer to indicate pressure in the tank, may be used. Special fittings such as automatic float gages, thermometer wells, sampling cocks, blending spiders, flame arrestors, foam chambers, swing lines, etc., can be installed if desired.

Economics of Cycling

by W. H. Woods*

In this article, the second part of which will be published in next week's issue, the author presents a general discussion of cycling, including an interesting comparison with other methods of production

CYCLING is defined as a method of producing gas-condensate reservoirs for their liquid content. The mechanics involved are the production of reservoir fluid, containing both gas and recoverable liquids; separation of the two by mechanical and absorption processes, and return of the dry gas to the reservoir. This method of production, when first applied, was called recycling. However, in actual practice it was found that the gas returned to the reservoir was only handled one time and the name was shortened to cycling by dropping the "re" as that implied that the gas would be handled several times.

Characteristics of Gas-Condensate Reservoirs

The most important characteristic of a gas-condensate reservoir is that the liquid content of the well fluid produced decreases as the pressure of the reservoir is depleted. The decrease in condensate content is the result of retrograde condensation of liquid in the reservoir. The condensation of liquids with decrease in pressure is called retrograde condensation because it is the opposite of normal condensation of liquids by an increase in pressure at the lower pressure ranges. The optimum pressure for condensation is the point at which normal condensation ends and retrograde condensation begins.

This characteristic of retrograde condensation in the reservoir was first recognized in the field by Dr. F. V. L. Patton of the Railroad Commission of Texas in his study of La Blanca field. Chart 1 is shown here as an illustration. The condensate-recovery curve decreased from 9 bbl. per million cubic feet of gas at a reservoir pressure of 3,800 psi. to a little more than 2 bbl. per million cubic feet of gas at a reservoir pressure of 2,200 psi. The corresponding points on the gas-oil ratio curve were 110,000 and 400,000 cu. ft. per bbl. respectively.

Another illustration of the characteristic of retrograde condensation observed in the field is that of the performance observed at Moore's field. Records have been kept of the gas and condensate production at this field since discovery. The original condensate ratios were in the order of 30,000 cu. ft. per bbl. During the latter part of 1936 and the entire year of 1937, when production of gas was small (that needed only for drilling fuel), the ratios were abnormally high at around 55,000 cu. ft. per bbl.

When heavier withdrawals were made during 1938 it was noted that the conventional type of lease crude-oil storage tanks were causing excessive evaporation losses. Additional stages of vapor separation, as well as pressure-type storage tanks, similar to those used in natural-gasoline plants, were installed and the gas-condensate ratios were reduced to around 45,000 cu. ft. per bbl.

The ratios gradually increased through 1938, 1939, 1940, and 1941 to approximately 60,000 cu. ft. per bbl. During this period flowing tubing pressures were sufficiently high so

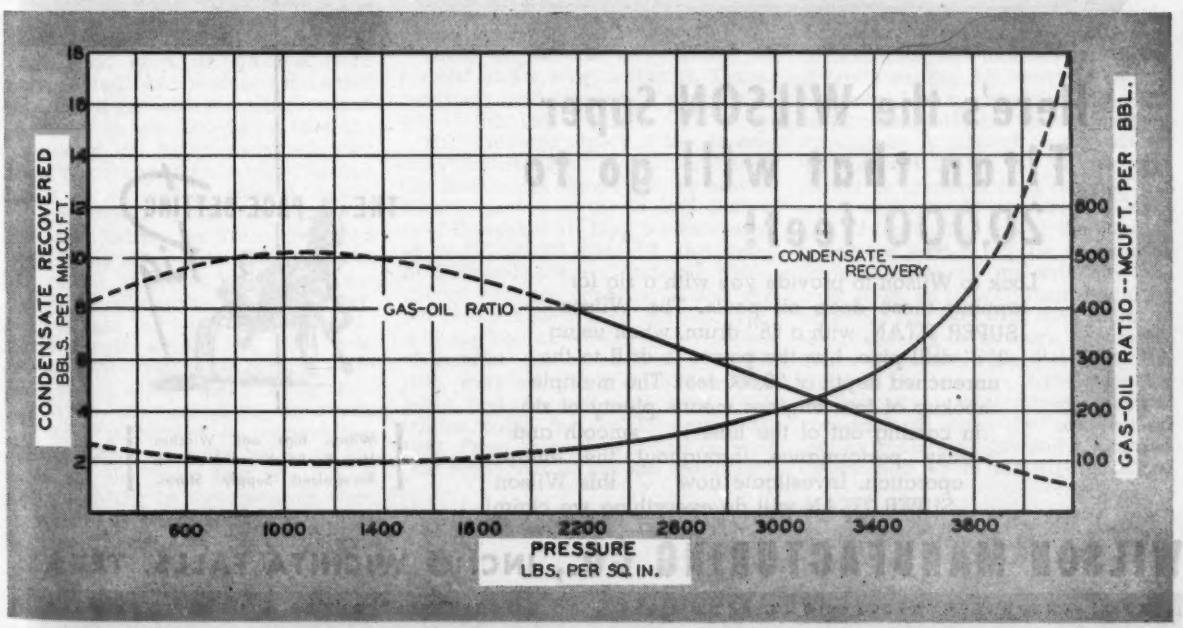
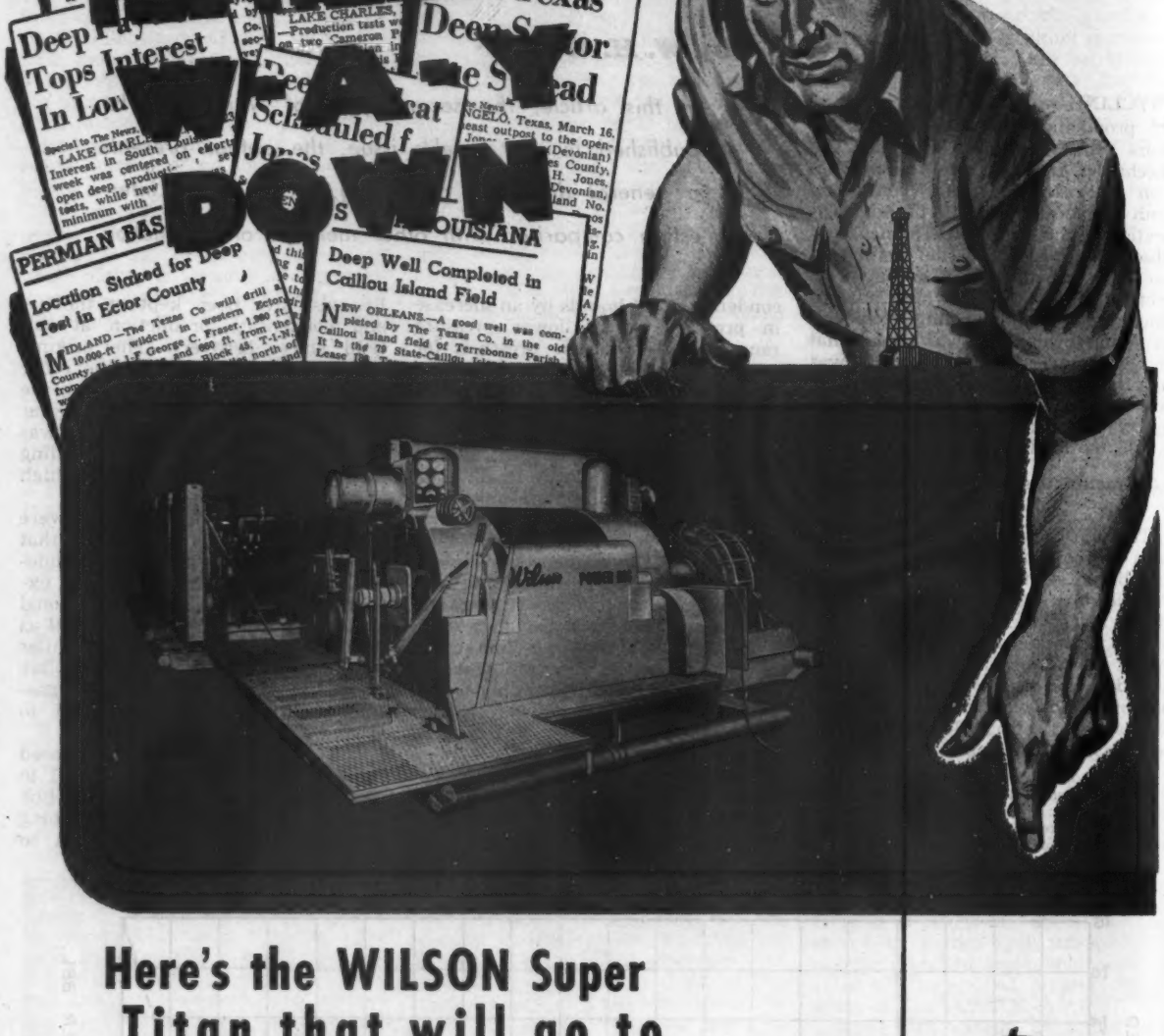


Chart 1—Characteristics of retrograde-condensation behavior in La Blanca field, Hidalgo County, Texas

*Division gas engineer, Houston division, Gulf Oil Corp. This paper is from the technical program at the production engineering conference of Gulf Oil Corp. held in Pittsburgh, May 12-17, 1947.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that heat had to be added to the gas at the outlet of the well chokes to prevent freezing in the flow lines leading to the central separator. However, due to pressure depletion and due to the heat absorbed by radiation in the flow lines from the atmosphere during the hot summer days, the separator temperature was noted to have increased to around 80° F. By the insulation of flow lines and the installation of an expansion valve at the separator inlet the temperature of the separator was reduced to 65° F. Due to this change the condensate ratios were decreased to 52,000 cu. ft. per bbl.

It was noted during the summer of 1944 that even with all heat cut off at the wells the separator temperatures increased as a result of further pressure depletion. In order to correct this condition a cooling tower was installed to cool the individual well streams before entering the primary separator. The tower and exchangers were installed during the summer of 1945. Gas-condensate ratios were again reduced to the normal trend established in 1941. This trend has been followed up to the present time.

The records at Moore's field, like those at La Blanca, are actual illustrations of the effect of retrograde condensation of liquids in the reservoir as a result of pressure depletion. Both of the field production records confirm on large-scale operation what has been demonstrated on small samples in model reservoir studies reproduced in the Harmarville and other laboratories.

Development of Cycling

Gas-condensate reservoirs overlying oil as gas-cap material were produced at Kettleman Hills in California and at Big Lake in Texas. However, the significance of their presence was not appreciated even though the wells were noted to produce increased amounts of gas with the same amount of liquid. It was also noted that the gravity of the liquid increased with a marked change from a black opaque liquid to a slightly colored liquid. Gas-condensate wells completed in the early thirties in Texas produced with ratios lower than 100,000 cu. ft. of gas per barrel of liquid were assigned oil allowables. The large volumes of gas produced with the relatively small amount of fluid was flared. This waste soon became large as a result of the many wells completed in gas-condensate reservoirs and was prohibited by reclassification of gas-condensate wells as gas wells on the basis that the gas-oil ratios existing in the reservoir were in excess of the statutory limit for oil wells 100,000 to 1. As such, gas-condensate wells could not be produced if the gas was not utilized for lighting and fuel, efficient chemical process, gas repressuring, or gas lift in the production of oil. Thus where markets for the gas could not be secured this order was in effect an order to cycle or close the wells in.

The first growth of cycling resulted as a means of disposing of dry gas produced from gas-condensate reservoirs after separation of the liquid content. As gas wells, the only restriction imposed on the daily production from gas-condensate wells was that they be limited in withdrawal to less than one-fourth of the open-flow potential, as determined by the U. S. Bureau of Mines method. Thus cycling operations handling large volumes of well fluid with dry-gas injection were able to produce large quantities of liquids, which on a well basis was several times the allowable crude-oil production from oil wells.

Other state conservation agencies are following the example of the Railroad Commission of Texas. In Louisiana, it is necessary to show evidence that waste will not occur before a permit is issued to produce gas-condensate wells. While it may be a simple matter to show that there will not be an economic waste resulting from producing a small reservoir such as the one at Moore's field, or a lean high-pressure reservoir such as the one at Hayes, the conservation commission is primarily interested in physical waste regardless of economics. It may be that a number of marginal reservoirs will be compelled to be cycled or will have to remain closed in for indefinite periods.

Cycling operations have been extended from Texas and Louisiana to California. Table 1 shows the number of plants in each of the three states together with the daily volume of gas processed, the daily production of liquid products, and the average liquid recovery in barrels per million cubic feet of gas as of the first of this year.

There are several large plants at present under construction in Texas, Louisiana, and Mississippi which will add to this list.

The combined report of the American Petroleum Institute and American Gas Association shows that the proven liquid reserves in the United States, as of December 31, 1946, are estimated at 24,227,447,000 bbl. Of this total 20,873,560,000 bbl. are crude oil, 1,050,794,000 bbl. are condensate, and the remaining 2,303,093,000 bbl. are natural-gas liquids. The proven reserves of natural gas as of December 31, 1946, were estimated at 160.6 trillion cubic feet as compared with 147.8 trillion cubic feet on December 31, 1945. From these data it can be seen that production of gas and condensate can be expected to increase in the future. Cycling operations, one of the major sources of condensate and natural-gas liquids, will also increase.

However, no method of production or manufacturing process can grow unless it is economically sound. In discussing the economics of cycling it is necessary to compare it with other methods of production. Before undertaking a study of economics, it is necessary to evaluate the gas-condensate reservoir.

Evaluation of Gas-Condensate Reservoirs

The evaluation of gas-condensate reservoirs involves the calculation of the quantities of the products in place, estimation of applicable recovery factors for the various methods of production, and calculation of the recovery in each case. There are two methods of calculating capacities of reservoirs: (1) the volumetric method and (2) the pressure-decline method.

In-place calculations — volumetric method.—In calculating the quantities of the various products in place by the volumetric method the following factors are required:

1. Depth of water-oil, gas-oil, or gas-water interfaces.
2. Location and throw of any faults.
3. Contours of the top of the producing section.
4. Thickness of the producing section.
5. Net porosity and permeabilities.
6. Location of shale or other nonporous streaks.
7. Bottom-hole pressure and temperature.
8. Composition of the oil and gas portions of the reservoir.

The depth of the water-oil, gas-oil, and water-gas interfaces should be located carefully from study of electric logs, core-analysis data, and production tests. The location and throw of faults cutting the reservoir can be determined from a study of well logs, geophysical data, and paleontological correlation. A subsurface map showing contours of the top of the sand should be prepared next showing the water and oil tables as well as location of faults. The top of the sand or producing section can be determined from well logs, and paleontology records. Next, an isopach map should be prepared and from this the bottom of the producing section can be drawn. From these data, together with the study of the location of shale breaks, the porosity as determined from the core-analysis data, the acre-feet of section containing gas and oil can be determined. From this figure should

TABLE 1—CYCLING PLANTS

State—	No. of plants	Daily gas volume, M.c.f.	Daily liquid production, bbl.	Av. content, bbl./million
Texas	29	2,310,357	56,726	24.6
Louisiana	6	517,192	27,530	53.2
California	2	93,000	10,658	114.6
Total	37	2,920,549	94,914	32.5

Q. Linked together, how far would this fleet of Cities Service tank cars reach? (1000 feet)? (1 mile)? (11 miles)? (3 miles)?

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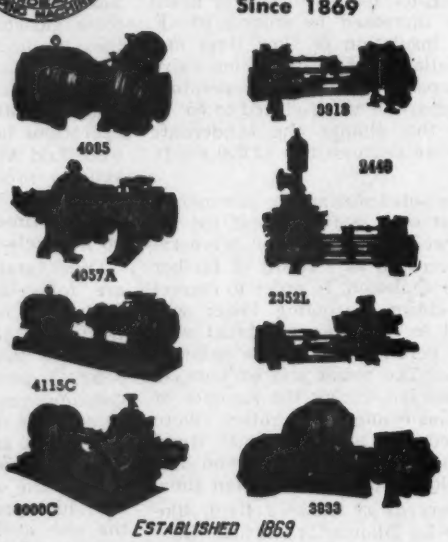

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be deducted the estimated connate-water content of the sand and the resultant will represent the net pore volume in acre-feet available for gas, condensate, and crude oil.

Bottom-hole pressure and temperature determined by actual measurement with a conventional bottom-hole pressure bomb should be obtained under virgin conditions before any appreciable quantity of gas and distillate is produced.

Composition of the oil and gas portions of the producing formation can be determined only by actual production tests from the reservoir. The approved method of determination of the gas and oil sections is to measure and sample the liquid and gas produced on the surface in a calibrated test separator. Needless to say the accuracy of the resultant calculation of the composite well fluid is dependent on the accuracy of the measurement and care in sampling of the separator products. There are many precautions to be taken in the production test including flowing the well under observation for a sufficient time and rate to allow stabilization of flowing pressures and temperatures of the well and the production separator, careful calibration of the separator, careful calibration of gas-measuring devices, correction for condensed water vapor, supercompressibility of separator gas, etc.

At the same time that samples are secured for determination of the well fluid, samples should be secured for dew-point determinations, retrograde characteristics (model reservoir study), supercompressibility determinations, and viscosity measurements of the gas-cap material. In like manner samples of the oil portion of the producing section should be secured for shrinkage data, solution ratios, viscosity measurements, etc.

With these data calculations of the quantities of stock-tank oil, debutanized condensate, butanes, propane, and dry gas can be calculated from the entire reservoir as well as for that underlying each individual tract of land.

In-place calculations — pressure-decline method.—The second method of calculating the quantity of reservoir fluid in place is only applicable for calculating gas and condensate where there is no water drive existing. This method of calculation cannot be used for determining the quantity of crude oil and its dissolved gases in place. The calculation is simple in that there is a straight-line relation between the content of the reservoir and the pressure, assuming of course, that there is no change in the supercompressibility of the reservoir fluid at the original and end pressure observed during the test. The mechanics involved are: (1) the determination of the bottom-hole pressure before starting the production test; (2) measuring the production of reservoir fluid, and (3) again determining the pressure of the reservoir after conclusion of the test. As an example the bottom-hole pressure at Moore's field of the lower gas sand was 3,207 psig. After a production test when 435 million cubic feet of reservoir fluid was produced, the bottom-hole pressure was 3,109 psig. Thus the original volume of reservoir fluid in place was calculated as follows:

Reservoir fluid in place

$$= \frac{3{,}207+14.7}{(3{,}207-3{,}109)+14.7} \times 435{,}000 \text{ M.c.f.}$$

$$= 12{,}435{,}000 \text{ M.c.f.}$$

Content tests of reservoir fluid expressed in barrels per million cubic feet of propane, butanes, and debutanized condensate can be applied to the reservoir fluid in place and the resultant quantities of each of these products in place can be obtained.

Chemical Unit Reorganized

The Technical Service Association of the chemical industry has been reorganized as the Commercial Chemical Development Association. It will work on problems and marketing of new chemicals and the expansion of markets for manufactured chemicals. New officers include Dr. L. B. Hitchcock, Quaker Oats Co., president.

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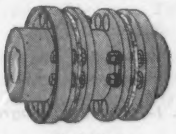
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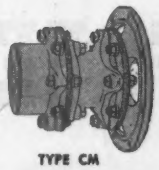
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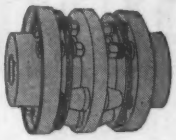
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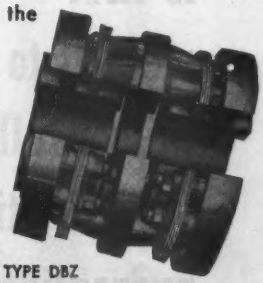
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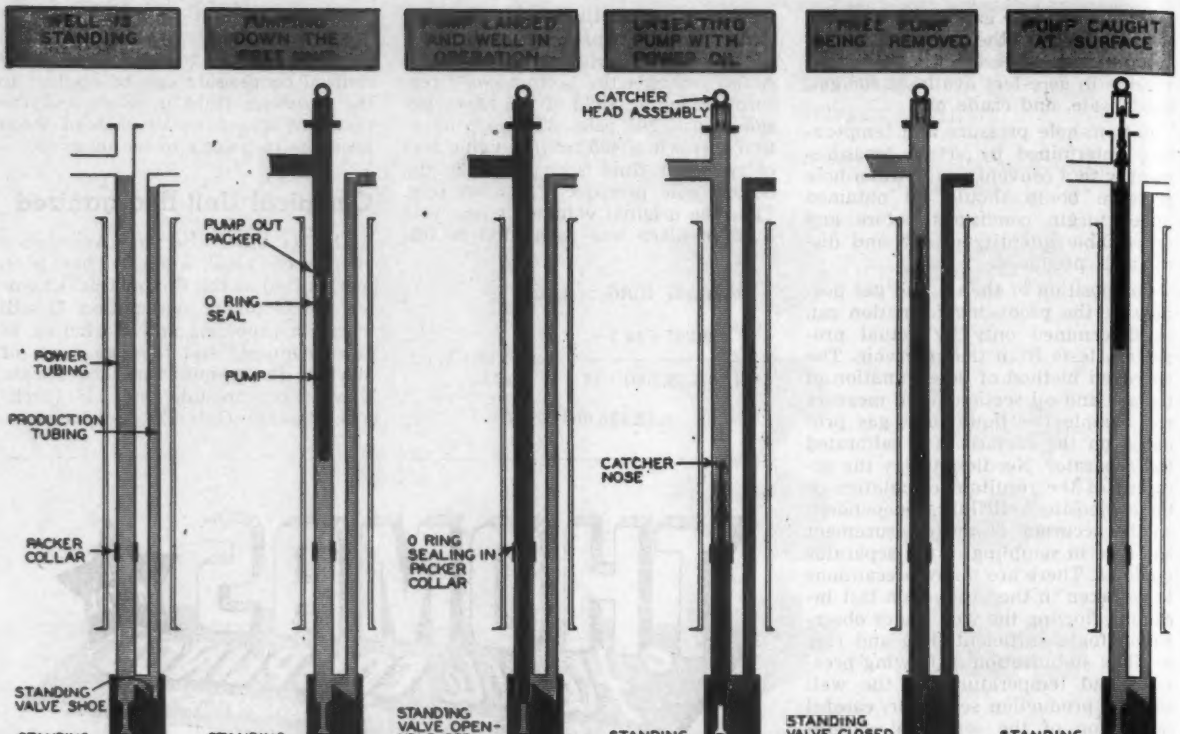

Fig. 1—Schematic diagram of the complete cycle of running and pulling the free pump. The type of installation illustrated is the parallel string which is used as it offers the simplest explanation of the operating principle

FREE PUMPING

is first method to utilize full potentialities of hydraulic drive

by Herndon David

A REVOLUTIONARY new method of oil-well pumping which applies fluid power to do the work of running and pulling a hydraulic subsurface oil-well pump recently has been introduced to the petroleum industry by Kobe, Inc. Designated as "Free Pumping," the new method makes pulling a well an easy, one-man job and promises to provide a major reduction in operating costs.

The free pump is an adaptation of the conventional hydraulic pump. The pump itself still consists of a hydraulically actuated engine end and pump end, housed in a long stainless steel barrel. A nose assembly, carrying rubber packers as a means of raising and lowering the pump in the well, marks the principal difference. Fig. 1 illustrates a 2-in. free pump prior to being run into a well. The rubber packers and nose assembly may be seen at the top of the pump.

Other principal differences in the conventional hydraulic system and the free-pumping system lie in the installation. In the latter system a four-way valve containing a catcher-head assembly is installed at the surface. Purpose of this valve is to control the direction of circulation of fluid in the two tubing strings required by the installation. Another principal difference is in the shoe which has been altered to facilitate the pump's seating above the standing valve.

Installation Methods

There are three types of free-pump installations, namely, the parallel string, concentric string, and casing type. The parallel system offers the simplest explanation of the operating principle, although this principle is the same in each case.

Fig. 1(A) shows schematically the tubing arrangement in the well with 1 or 1¼-in. tubing clamped and parallel to either 2 or 2½-in. upset tubing. The two tubing strings are connected at the bottom of the well by a shoe housing which also contains a standing valve (shown closed in this illustration). Not shown in the illustration is the four-way valve which has three operating positions and which is installed at the surface. Fig. 1(A) represents schematically the conditions when the valve is in the "Shutoff and Bleed" position—shutting off both the surface power oil and lead lines and "bleeding" the tubing strings to the atmosphere. As can be seen, with the standing valve closed, both strings of tubing can stand full of fluid, simulating a "U" tube.

Fig. 2—(Left) This standing valve and shoe assembly for the parallel system is retrievable and can be pulled by a fishing tool on a small wire line. The magnet serves to hold the ball off its seat during pumping operations

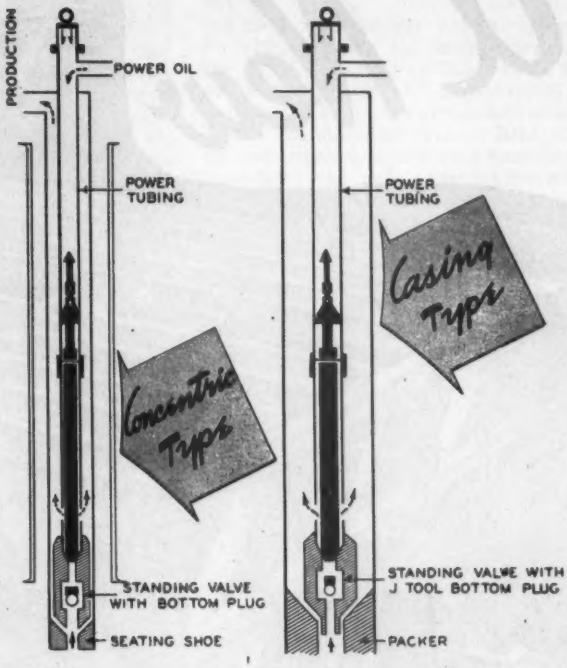

Fig. 3—(Right) The concentric type of free-pump installation is desirable for deep wells where the installed production tubing is large enough to accommodate the system. The casing type of installation is the simplest and most economical of the three types. Economy is obtained as it is necessary to run only one string of tubing as compared with two strings for the parallel and concentric types

Fig. 1(B) shows the pump inserted and the tubing closed with the catcher-head assembly in place. The catcher-head assembly is held in place by a breech lock and can be removed easily without the aid of tools when there is no pressure on the underneath side. If the pump is operating and power oil applying a pressure to the bottom, however, the

Below, left: Parallel installation of Free Pump. The packer nose assembly, equipped with cup type rubber packers, is shown just above pumper's left hand. The packers provide the lifting area to circulate the pump to the surface and aid in reseating. Below, center: Caught in the pump catcher upon surfacing, the pump is pulled from the power tubing at the well head by means of a light block and tackle attached to collapsible mast. The four-way valve handle is in "Shutoff and Bleed" position to bleed pressure from both power and production tubing. Below, right: Closeup view showing catcher-nose assembly on top end of subsurface pump, which slides into the catcher-head assembly when pump surfaces. Immediately above pump, in pumper's left hand, is the catcher-head assembly

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Concentric free pump installation with power tubing set inside production tubing

assembly is forced upward a fraction of an inch to engage the breech mechanism and the assembly cannot be removed.

When the pump has been inserted and the catcher-head assembly placed in position, the four-way valve is turned to the "Pump In and Operating" position. As shown in Fig. 1(B), power oil is then directed into the top of the large tubing, either pushing or following the pump down.

When the pump reaches the bottom, it automatically seats in the standing valve shoe, and an "O" ring seal on the pump lands in a packer collar in the tubing as shown in Fig. 1(C). The power oil then forces the "O" ring to seal, which in turn forces the power oil into the engine end of the pump to operate it. The pumped fluid and exhausted power oil return to the surface through the small tubing. During the pumping operations the standing valve is held off its seat by a permanent magnet.

When it becomes necessary to surface the pump, the four-way valve at the surface is turned to the "Pump Out" position. This reverses the flow of the power oil, forcing it down the small tubing and through the lead line into the bottom of the large tubing. Fig. 1(D) illustrates this first step of the surfacing operation. The power oil entering the large tubing exerts pressure underneath the pump on the full area minus the area of the pump bottom plug, which is open to formation pressure through the standing valve. On the top of the pump the fluid column exerts pressure on the full area of the pump. It is only this pressure differential which must be overcome by the power oil to unseat the pump. As the pump is unseated, a quick rush of fluid through the standing valve overcomes the force of the magnet and the ball check is closed.

Fig. 1(E) shows the closed circuit with the flow lifting the pump up the tubing. Once the pump is off its seat, the full area of the pump packer becomes effective lift area and very slight pressure is required to bring the pump to the surface. As an example, a 2-in. hydraulic pump weighs approximately 60 lb. and the effective lift area is approximately 3 sq. in. Pressure required for lifting, then, is only 60 ÷ 3 or 20 psi. The surfacing packers, therefore, have very little work to do in the lifting operation and the main job is to maintain efficiency by sealing against the various joint enlargements and recesses.

Latches in Assembly

When the pump reaches the surface, it latches in the catcher-head assembly as shown in Fig. 1(F). The four-way valve is then turned to the "Shutoff and Bleed" position. The catcher may then be loosened and with it the pump lifted out of the tubing.

The standing valve assembly used in the parallel system just described is retrievable and can be pulled by a fishing tool on a small wire line. Incorporated in the valve is a knockout bleeder pin, broken by the fishing tool, to drain the tubing system for either pulling the tubing dry or for removing the standing valve. A schematic diagram of this assembly is shown in Fig. 2. As previously mentioned, the standing valve is held off its seat magnetically during pumping operations and only seats during the pump-out operation. With this practically negligible service, there is no problem of standing valve wear.

Concentric and Casing Types

The concentric system (see Fig. 3) is the same in operating principle as the parallel system. Principal difference is that the small tubing is run inside the large tubing. In this type of installation, the small tubing functions as one leg of the "U" tube, while the annular space between the two tubing strings functions as the other leg.

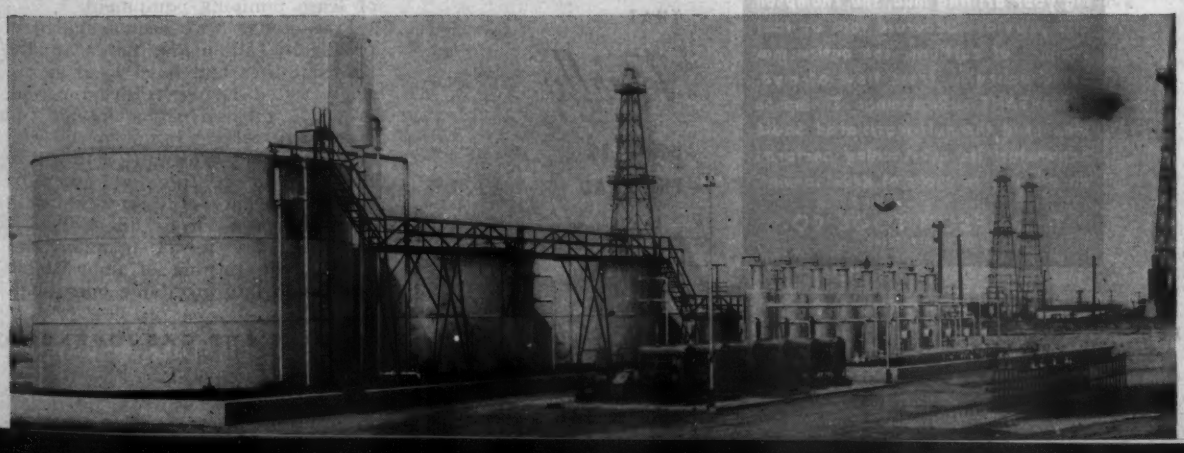
The concentric system is particularly desirable for deep wells where the installed production tubing is large enough to accommodate the system. The standing-valve assembly is run on the inner string, seating in a special shoe which may have been previously installed in the outer string or which is adaptable to any seating arrangement in the string without pulling.

The casing-type installation (see Fig. 3) is the extreme in simplicity and economy. This type is applicable to those wells in which gas and other conditions allow casing type pumping.

Running and Pulling Time

The travel speed of the free pump in either running-in or surfacing operations depends on the rate of circulation and the efficiency of the packer assembly. Pump-travel speed will vary with the rate of displacement of the tubing through which it travels. For example, approximate displacement figures can be used as follows: 2-in. tubing capacity is 4 bbl. of fluid per 1,000 ft. In the case of a 2-in. installation, if the circulation rate is 40 bbl. per hour, the travel speed of the pump would be 10,000 ft. per hour at 100 per cent

Power-oil tanks and separators used on lease on which 20 wells, 2 of these representing new free pump installations, are pumped hydraulically. The triplex pumps supplying the surface power are shown forward of the tanks. In right foreground is the manifold from which subsurface pumping pressures are controlled



packer efficiency. Under these conditions, it would require approximately 30 minutes to surface a pump in a 5,000-ft. well.

In actual practice, because of the effective variables of packer wear condition, tubing-diameter variations and circulation rates, typical efficiencies will have to be obtained from local experience. One pilot well in Dominguez field in California, with a pump setting of 5,000 ft. and a production of 60 bbl. per day, has been found to surface in 55 minutes and reseat in slightly more than 40 minutes. The time in both operations was substantially reduced, however, by increasing the circulation rate. This was accomplished by increasing the pressure of the power oil at the manifold.

Paraffin Control

The parallel system of free pumping offers excellent features for paraffin control in that both strings are full bore and can be treated by the soluble-plug method. In the power string, it is merely necessary to remove the catcher-head assembly and insert the soluble plug which is then circulated down the string. For the production tubing a soluble-plug injector has been designed which makes it possible to pump the plug down the string by unseating the pump and reversing the circulation.

The concentric system of free pumping is not adaptable to areas where production-side paraffin is a problem because a suitable hydraulic lift for treatment of annular paraffin has not yet been developed.

Operating Costs

Outstanding among the features of free pumping are the reduced operating costs and pumping efficiencies obtainable with the method. The free pump completely eliminates pump pulling and need for derricks and servicing equipment. As an example of the savings introduced, consider the case of a 5,000-ft. well. In order to change a conventional pump in such a well, a crew of several men is required to pull the rods, change the pump, and return the pump and rods. Generally several days are required to complete this operation, and it is estimated that 25 to 30 per cent of the operating costs of a pumping lease is due to pulling and rerunning of pumps.

On the other hand, if the well is equipped with a free pump, all that is necessary is for the pumper to switch the four-way surface valve to the "Pump Out" position. He can then go about other lease duties until the pump has had time to surface. He then returns to the well, switches the valve to "Shutoff and Bleed" position, removes the old pump and inserts a new one. The valve is then turned to the "Pump In and Operating" position, and he once again returns to other lease duties. The pump circulates down the hole, reseats, and automatically begins pumping. In this case, the 25 to 30 per cent of the operating costs consumed in pulling and rerunning pumps is saved, and the well is off production only for a very few hours instead of several days.

Increased pumping efficiency and economical use of lease equipment is also possible with free pumping. For example, when the volume of fluid to be pumped increases or decreases, the correct size pump to lift the desired amount of fluid can be changed easily for the one in the hole. It is possible, therefore, within the limits of the tubing, to keep the correct-sized pump in the hole at all times, thus assuring maximum pumping efficiency. Pumps also easily can be shifted from well to well, assuring the best and most economical use of lease pumping equipment.

Free pumps have been installed in practically all major fields in the United States and have been extensively tested during an 8-year period, proving themselves adaptable to practically all conditions of oil-well pumping. They are the first to utilize the full potentialities of hydraulic power, and the resultant savings in operating costs due to this method of pumping may mean, in many instances, the turning of unprofitable production into profitable operations.

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PROGRESS IN METALS

by W. L. Nelson

Consulting Engineer

Entrainment Screens

ENTRAINMENT is an objectionable and troublesome feature of many evaporation and distillation systems. It signifies the loss of liquid as droplets, suspended in the form of a fine mist which is carried upward by the flow of a gas or vapor. It obviously tends to occur when a liquid boils but it also occurs at ordinary temperatures in knockout drums, scrubbers, absorbers, strippers, etc.

A common method of combating entrainment is to provide "head room" for the vapor above the disengaging surface of the liquid and vapor. This increases the height, cost, and heat losses from the equipment. Another method is to use baffles which guide and turn the vapor past surfaces upon which the liquid droplets accumulate and drain back into the liquid proper. An extreme in this direction are mist extractors which impart centrifugal force to the fluid, a construction somewhat similar to the cyclone separators used for collecting dust from a gas stream.

Long Employed

Metal screens have long been employed. Metal Textile Corp., Orange, N. J., manufactures a new and highly efficient form of entrainment screen out of corrosion-resistant knitted metal mesh. This hits right at the heart of difficulties with screen-type separators, because the only major trouble with them is the tendency to become plugged with corrosion debris or dirt, and the corrosion-resistant method helps keep debris from accumulating. In the words of the manufacturer:

"These separators are fabricated by first knitting continuous lengths of wire, and then fabricating the knitted mesh into the three-dimensional sections which comprise the entire separator. It is the knitted construction which provides the combination of resiliency and structural strength which, combined with the extensive evenly distributed wire surfaces, are the features accounting for the efficient performance of these separators. While the efficiency of entrainment is exceptionally high, practically always 100 per cent, the pressure drop is very low. This feature of low pressure drop makes these separators ideal for vacuum operations, as well as atmospheric or high-pressure operations."

A main application in refineries is to place the separator just above the feed inlet of a fractionator. Large installations are built in sections for easy installation. They are also used at the tops of scrubbers, etc., to prevent the entrainment of liquids with the outgoing gas stream. Fig. 1 indicates the construction of such a screen. Obviously, screens cannot be employed if large amounts of solid debris are present, unless frequent cleaning can be contemplated.

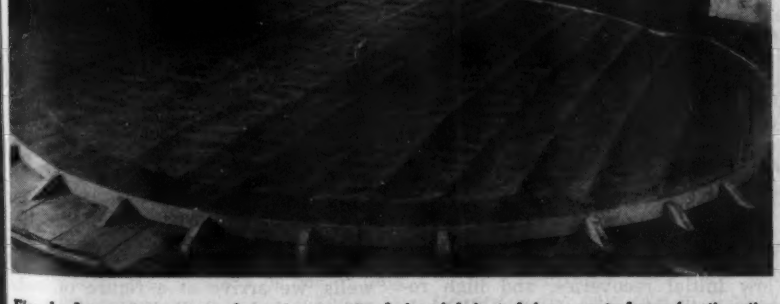

Fig. 1—Large screen entrainment separator being fabricated for a petroleum fractionating tower. (Courtesy, International Nickel Co.)

Nondestructive Testing Of Castings

VARIOUS nondestructive testing methods other than radiography and magnetic particle inspection are discussed. The limiting factor controlling their use involves the correct interpretation of the results. Before any method is adopted, a set of workable standards must be agreed upon which distinguish between flaws or blemishes and real defects that may affect the ultimate service.

The use of a fluorescent penetrant on castings is a development of the old "Whiting" method. The method consists basically of immersing the casting for a suitable time in a light penetrating oil treated for high fluorescent brilliance. The casting is then washed and examined under ultraviolet light. The defects appear to fluoresce where the penetrant oil has returned to the surface.

The popularity of this test is due to its low cost. However, it is limited to disclosure of surface defects only. Its use makes possible the repairing of defective castings before final radiographic examinations. It does not replace radiography but supplements it.

Static loading nondestructive tests are commonly used to determine the quality of the material and to develop satisfactory designs. The loading is usually 1.5 or more times the maximum service loads, so castings with substandard strength are detected. Static proof testing to determine the load for permanent set of destruction is often used on castings with known defects as disclosed by other methods to aid in establishing the permissible extent of casting defects.

Hydrostatic testing of pressure-type castings has superseded practically all forms of nondestructive testing. Air-pressure tests, often at pressures greater than the working pressure, are common with castings to be immersed in water. Steam, cold or hot oil pressure, or an air test of unmachined pressure fittings is often used to detect defects which pass from wall to wall of the casting.

Acoustic tests, such as striking a casting with a hammer, are largely dependent upon the operator's skill. The application of supersonic wave testing to castings has been limited to special applications and could be generally expressed as being in the experimental stages. The available equipment is highly sensitive to surface irregularities and minute blenishes.

Electrical methods of flaw detection in castings have been tried with limited application and degree of success for some types of castings. However, there are two methods used for segregating materials of varying analysis and states of heat treatment although they are not suitable for disclosing defects or flaws. One is based upon the change in electromotive force induced by the test piece as compared with that of a known standard.

The cyclograph uses the principle of varying metallurgical properties that cause variation in the core loss of the tuned pickup coil which surrounds the piece under test. This instrument is limited to uniform casting sections which can be inserted into a suitable coil.

Abstract of paper by J. W. Juppenlatz, American Foundryman, Vol. 9, January 1946, page 38, taken from Materials and Methods of May 1946.

Future of OIL in WEST VIRGINIA

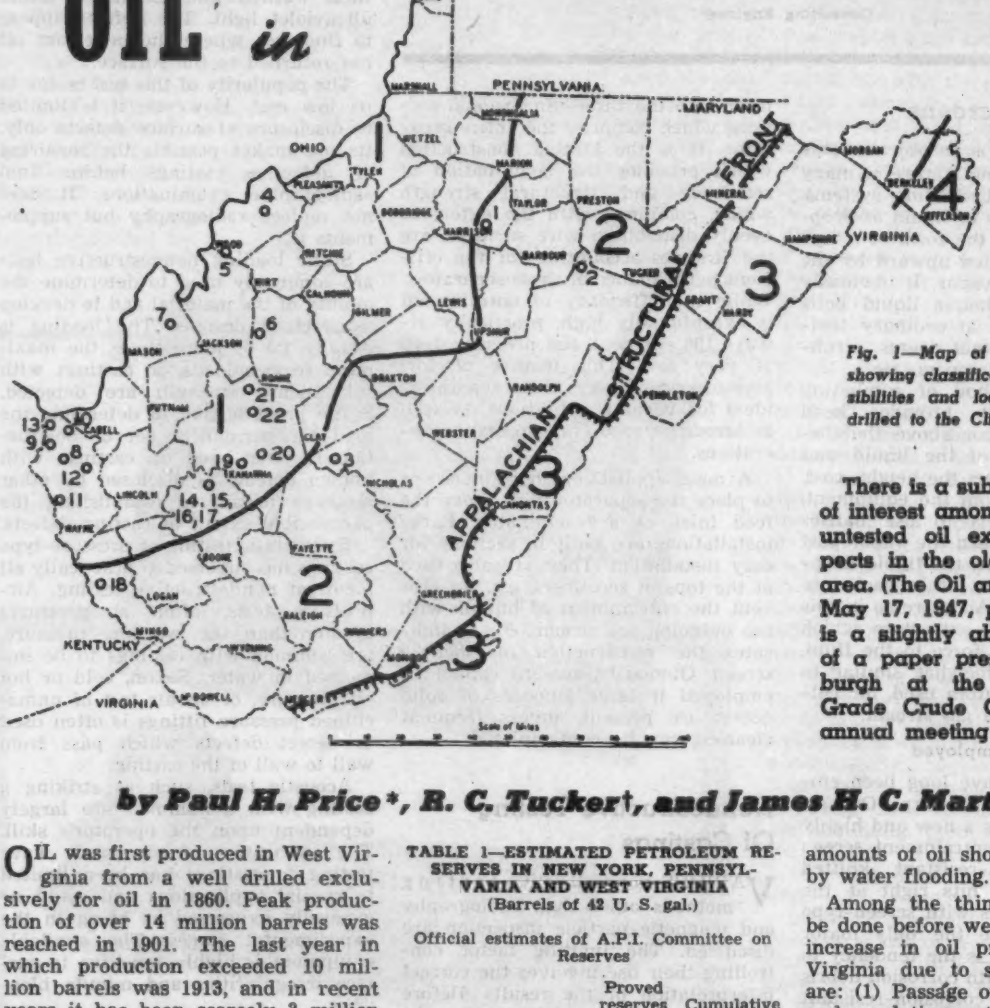

Fig. 1—Map of West Virginia showing classification of oil possibilities and location of wells drilled to the Clinton sand

There is a substantial revival of interest among geologists in untested oil exploration prospects in the old Appalachian area. (The Oil and Gas Journal, May 17, 1947, page 129). This is a slightly abridged version of a paper presented in Pittsburgh at the Pennsylvania Grade Crude Oil Association annual meeting in June.

by Paul H. Price*, R. C. Tucker†, and James H. C. Martens‡

OIL was first produced in West Virginia from a well drilled exclusively for oil in 1860. Peak production of over 14 million barrels was reached in 1901. The last year in which production exceeded 10 million barrels was 1913, and in recent years it has been scarcely 3 million barrels.

Of the 55 counties in West Virginia, 32 have produced oil. The most important of the more than 20 producing sands are of Upper Devonian and Lower Mississippian age, but several Pennsylvanian sands have also yielded significant quantities of oil.

The known oil fields are limited to the northern and western part of the state marked on the map as Region 1. The area in which they occur is about 5,760,000 acres, of which about 435,000 acres are proven. This compares with an area of 3,380,000 acres in which the oil pools of Pennsylvania occur, of which about 533,000 acres are proven.

The most recent estimate of proved oil reserves of West Virginia is given in Table 1. In comparing the proved reserves of West Virginia with those of New York and Pennsylvania, it should be noted that the reserves for West Virginia include little or nothing for oil to be recovered by water flooding and probably only a small amount for oil to be recovered by repressuring with gas or air. Practically all of the reserves estimated for New York and most of those estimated for Pennsylvania, are expected to be recovered by water flooding. The general lack of an effective water drive in the oil fields of West Virginia and the inefficient use of the energy of the reservoir gas in producing the oil resulted in low initial recoveries, and high residual-oil saturation in the oil pools of the state, so that large additional amounts of oil should be recoverable by water flooding.

TABLE 1—ESTIMATED PETROLEUM RESERVES IN NEW YORK, PENNSYLVANIA AND WEST VIRGINIA
(Barrels of 42 U. S. gal.)

	Official estimates of A.P.I. Committee on Reserves	
	Proved reserves Dec. 31, 1946	Cumulative production
New York	76,289,000	158,155,000
Pennsylvania	97,501,000	1,008,277,000
West Virginia	35,655,000	432,706,000

Among the things which need to be done before we will see any large increase in oil production of West Virginia due to secondary recovery are: (1) Passage of a law permitting and regulating water flooding; (2) detailed technical study of individual pools; (3) working out of agreements among operators that will permit operation of a whole pool or a convenient part of it as a unit.

Possible Oil Reserves

In recent years no large oil pools have been discovered in West Virginia and previously known pools have been slightly extended. This is no indication that all of the oil in the shallow sands in the known oil-bearing portion of the state has been found. For the period 1935 to 1946, inclusive, the summation of the annual statistics shows that 1,561 oil wells, 6,680 gas wells, and 1,663 dry holes were drilled. Assuming that the dry holes drilled for oil and gas were in the same ratio as the productive wells, we arrive at a figure of only 310 dry holes drilled for oil in 12 years.

*State geologist. †Assistant state geologist. ‡Mineralogist, West Virginia Geological Survey.

Deeper sands in Region 1.—Practically all of the oil production of West Virginia has come from depths of less than 4,000 ft. The few deep tests which have been drilled cannot be considered as showing the absence of important oil reserves in the older formations although no important deep discoveries of oil have been made thus far in West Virginia, Pennsylvania, or the parts of Ohio and Kentucky adjacent to West Virginia.

Records of deep wells in Kentucky show 6,000 ft. of sediments below the deepest horizon tested by drilling in Wayne County, West Virginia. To the east the thickness of untested sediments becomes much greater, and it is conservatively estimated that in the part of West Virginia which contains the known oil pools the volume of potentially oil-bearing rocks not yet tested but within possible drilling depths is from two to three times as great as the volume which has been prospected in the past.

The generally favorable conditions for the occurrence of oil at greater depths in Region 1 of the map may be summarized as follows:

1. Presence of thousands of feet of marine sediments from Cambrian to Devonian age, only slightly deformed.
2. Presence of several possible reservoir rocks.
3. Westward thinning of sediments in updip direction toward Cincinnati arch.
4. Wide distribution of oil in younger formations.

The general region of the Burning Springs anticline is considered as particularly favorable for deep oil tests. Much of the Ordovician section in the western counties, Wayne, Cabell, and Mason, could be tested with 8,000-ft. wells or no deeper than several of the Oriskany wells farther to the east.

Oriskany Sand

The Oriskany sandstone probably extends beneath all of Region 1 and 2, as outlined on the map. However, in the westernmost part of the state it is thin and highly calcareous. It is not generally reported in the well records for Cabell, Mingo, and Wayne counties, and sample studies indicate that it is there too thin and too highly cemented to be likely to yield oil or gas.

Up to May 1, 1947, a total of 1,246 wells have been drilled to or beyond the Oriskany horizon in Region 1 of the state. Of these, 1,030 are gas wells, 3 oil wells, and 213 dry holes. Most of the gas wells have been drilled in the area of approximately 150,000 acres proved for gas production in Kanawha, Jackson, and Putnam counties. The 213 dry holes, at 250 acres per well, may be assumed to have tested to the Oriskany or below, only 54,000 acres.

Only one well in West Virginia, in Elk district, Kanawha County, can certainly be classed as a commercial oil well in the Oriskany. A few others may have produced small quantities of oil. Counties in which shows of oil have been found in the Oriskany are Boone, Hancock, Jackson, Putnam, Roane, Wirt, and Wood.

"Newburg Sand" and "Corniferous Lime"

A sandstone occurring 750 to 800 ft. stratigraphically below the top of the Huntersville chert in Boone and Kanawha counties has been called the Newburg sand. Two small gas wells produce from this sand in Boone County. Several wells in Wayne County have produced gas from about this horizon, but the gas is probably from the Silurian dolomites rather than from a true sand. In view of the small number of tests to the Newburg sand, it should be considered as a possible oil reservoir, although it has not yet produced oil in West Virginia.

In several oil pools in eastern Kentucky, the producing formation is limestone or dolomite of Silurian age, generally designated as "Corniferous lime," but considerably older than the Huntersville chert, to which the name Corniferous lime is applied in West Virginia.

Big Six (Keefer Sand)

In Kanawha and Boone counties, and from there westward to Kentucky, a very fine gray dolomitic sandstone about 30 ft. thick occurs at the top of the Clinton formation. This is known to the oil and gas operators as the Big Six sand and is correlated with the Keefer sandstone of the outcrop sections to the east. Several wells produce gas from it in Wayne County. It should be further prospected for both oil and gas.

Clinton Sand

The Clinton sand of Ohio is thought to be present under all of Regions 1 and 2. It has been penetrated by only 22 wells in West Virginia, and all except 4 of these wells are in Region 1. One well in Boone County and one in Kanawha County have produced gas from the Clinton sand; the rest have been dry.

The interval from the Berea to the Clinton sand is under 2,000 ft. in western Wayne County and increases eastward at the rate of 50 ft. to the mile. In Wayne County and a considerable part of Mingo, Cabell, and Mason counties, drilling depths to the Clinton sand would be 5,000 ft. or less. On the structurally highest part of the Burning Springs anticline, the drilling depth to the Clinton sand might be a little under 6,000 ft.

Ordovician and Cambrian Formations

The Heinzman well in Roane County is the only one in West Virginia which has penetrated any appreciable distance into the Ordovician rocks. With a total depth of 9,104 ft., this has 239 ft. of Trenton limestone at the bottom. Several deep wells in Kentucky and Ohio indicate that a minimum section of over 6,000 ft. of sediments below the base of the Clinton sand may be expected in the extreme western part of West Virginia. The section thickens in an eastward direction but until there is more deep drilling we can say little about the rate of thickening of particular formations. Possible reservoir rocks for gas and oil are the "St. Peter" sandstone and various limestones and dolomites.

Region 2.—The area designated as Region 2 on the map is west and north of the Appalachian structural front and east and south of Region 1, which contains all the important developed oil pools of the state. The only oil production in Region 2 has been a small amount in Taylor, Upshur, and Nicholas counties. Some parts of this region are being actively prospected for gas with very encouraging results.

The northeastern part, comprising most of Preston, Tucker, and Randolph counties, and parts of adjacent counties is more folded than the rest and it is believed that it is not likely to contain much gas or oil in formations above Oriskany. The southern part is only slightly more folded than Region 1, and the Mississippian section is much thicker than in the rest of the state. It is believed likely to produce oil from the Mississippian as well as the older formation.

In all of Region 2, with an area of over 11,000 sq. miles, anly 20 wells have been drilled to the Oriskany. Four or five of these are gas wells and the rest dry holes. Only two of these wells went deep enough to test the Clinton sand. Except on a few of the larger anticlines, the drilling depths to the Oriskany and older formations are greater than in Region 1. None of the Ordovician rocks have yet been tested by drilling.

Region 3.—Region 3 on the map is that part of West Virginia east of the Appalachian structural front. This more highly folded area is almost completely untested for oil or gas. It is a part of what is generally designated the Ridge and Valley physiographic province. Jefferson County and the eastern half of Berkeley County are excluded because there some of the rocks are appreciably metamorphosed. Eastern West Virginia, including not only Region 3, but also much of Region 2, has generally been considered unfavorable for both oil and gas.

The reasons for this opinion are briefly summarized as follows: (1) The rocks are too highly folded; (2) faults and fractures are too numerous; (3) all of the known productive sands of the state outcrop and some of them have been eroded away from large areas; (4) the carbon ratios of

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the coals are too high; () the known and developed oil fields of the state are a long distance away.

As a result of increasing knowledge of the occurrence of oil and gas we now think much more favorably of the possibility of oil and gas production from the folded rocks of eastern West Virginia and their continuation into Virginia, Maryland, and Pennsylvania. We shall consider in order the reasons just given for previously condemning this region as unfavorable or even impossible for oil.

Amount of Folding

If other conditions are favorable, a considerable degree of folding, even in Paleozoic rocks, does not necessarily preclude the occurrence of petroleum and natural gas in large amount.. Most of the folds of the Ridge and Valley province to the east of the Appalachian structural front are of the open type and only in a few small areas are the beds vertical or overturned, although dips are often steep. Under the Allegheny Mountains, to the west of the Allegheny structural front, the intensity of folding is much less than it is in most of the area to the east of the front, although still more than in most of the oil and gas fields of the Appalachian region.

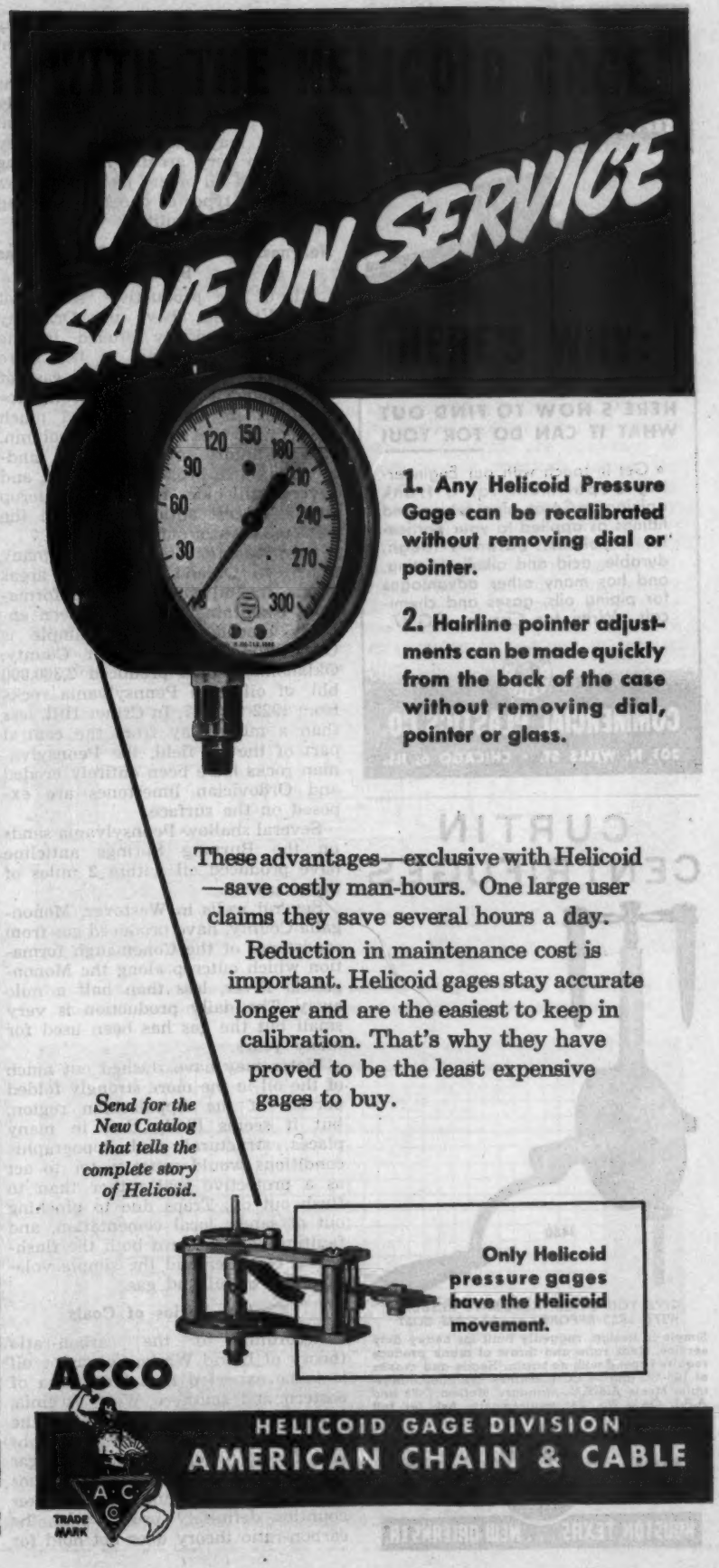
The oil pools of southern Oklahoma, in Carter and Stephens counties, are in an area where the intensity of folding of the Paleozoic rocks in which the oil occurs is about the same as in eastern West Virginia.

The cumulative oil production for the southern Oklahoma oil pools is about the same as that for the whole state of West Virginia. Nearly half of this production has come from Healdton field, which in 1946, more than 30 years after its discovery, was still producing nearly as much oil as the entire state of West Virginia.

The first oil production in West Virginia was obtained on and near the Burning Springs anticline. The greatest dips are 20° to 30° on the eastern side and 50° to 70° on the western side of this fold.

Faults and Other Fractures

The rocks of eastern West Virginia have more faults and other fractures than those of the western part of the state. There is no reason to doubt that fractures have allowed some gas to escape but most of the escaping gas probably came from shallow depths. In thick shales, faults are not likely to remain open to the surface long enough for escape of large quantities of gas. In many oil and gas fields faults help to form the trap which confines the oil and gas and causes their accumulation. Fractures other than faults could have little effect on escape of fluid hydrocarbons except close to the surface, because few such fractures are continuous for any great distance and a very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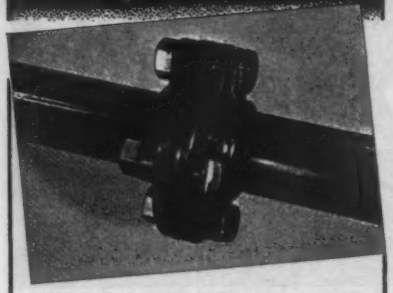

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large portion of them stop abruptly at boundaries between different kinds of rocks.

Fractures in brittle rocks in regions of moderate to strong folding not only provide reservoir space in which oil and gas may accumulate, but they may help very greatly in increasing the flow of oil or gas from reservoirs with other types of pores and having very low permeability.

Nearness to Outcrop of Oil and Gas Sands

All of the productive "sands" of West Virginia above the Oriskany outcrop are partly eroded in the Allegheny Mountains. In the more strongly folded areas to the east of the Appalachian structural front erosion has in places extended much deeper into the stratigraphic column. The continuity of the Oriskany sandstone is much broken by erosion, and several still older formations outcrop in the largest anticlines and in the extreme eastern part of the area.

Oil production is obtained in many places in Oklahoma close to areas where the oil sands and the formations containing them have been entirely eroded. A good example is Crinerville field in Carter County, Oklahoma, which produced 2,300,000 bbl. of oil from Pennsylvania rocks from 1922 to 1927. In Criner Hill, less than a mile away from the central part of the oil field, the Pennsylvanian rocks have been entirely eroded and Ordovician limestones are exposed on the surface.

Several shallow Pennsylvania sands on the Burning Springs anticline have produced oil within 2 miles of their outcrop.

Several wells in Westover, Monongalia County, have produced gas from sandstones of the Conemaugh formation which outcrop along the Monongahela River, less than half a mile away. The daily production is very small but the gas has been used for many years.

Water may have flushed out much of the oil in the more strongly folded portion of the Appalachian region, but it seems likely that in many places structural and topographic conditions would cause water to act as a protective seal rather than to flush out oil. Traps due to pinching out of sands, local cementation, and faulting would retard both the flush-action of water and the simple volatilization of oil and gas.

Carbon Ratios of Coals

According to the carbon-ratio theory of David White, no gas or oil is to be expected in a large area of eastern and southern West Virginia, because the high carbon ratios of the coals indicate too much metamorphism. Recent development of large gas reserves in areas of high carbon ratios in Raleigh, Wyoming, and Tucker counties definitely proves that the carbon-ratio theory does not hold for gas. Competent geologists have recently questioned its validity as an indication of areas favorable or unfavorable for oil.

Suggestions for Well Locations, Region 3

The major structural features of the surface rocks of eastern West Virginia are very obvious and are well shown on published geologic maps. Approximate locations for prospective tests can be decided upon by inspection of these maps, and depths calculated from published information Some of the larger anticlines should be drilled first, but the possibility of effective oil traps related to faults should not be overlooked. Local complications of structure which it was not practicable to show on the published maps on a scale of an inch to a mile, will require more detailed geologic work in places considered for drilling sites. If oil should be discovered in commercial quantity development will need to be controlled by very careful work on both the surface and subsurface geology.

A.P.I. Research Project 44 Data to Be Published

Results of 5 years' research in the physical and thermodynamic properties of all hydrocarbons conducted by the American Petroleum Institute Research Project 44 is now being prepared for publication in book form.

The research project was set up in August 1941 between the National Bureau of Standards and the A.P.I. The studies have established properties of thousands of hydrocarbons and served as a clearinghouse of information on the subject. Dr. Frederick D. Rossini, director of the project at the Bureau of Standards, said the publication will be unique in that it will contain the collected data of industrial, academic, and government laboratories.

East Coast Refineries Running Above Capacity

NEW YORK.—Refinery operations on the East Coast have been boosted far above the normal rated capacities of the plants, the American Petroleum Institute reports after a survey. One large plant is turning out 193 per cent of its rated capacity of products, while several others are well above normal rate, up to 140 per cent of capacity in many cases.

Review of the over-all country-wide situation indicates that on the East Coast demands will be met satisfactorily unless an especially severe winter occurs and substitute fuels are not in short supply. Similarly no serious crisis exists on the Gulf or West coasts but the Midwest area faces a more serious undersupply, chiefly because of transportation bottlenecks.

MODERN Rotary DRILLING

Miscellaneous Rotary-Drive Equipment

IN the preceeding installment, general characteristics and three different types of independent rotary drives were discussed—steam, electric, and one of their variations, the turboelectric drive. Consideration of independent rotary drives powered by internal-combustion engines is now discussed.

Internal - combustion - engine drives.—Hydraulic torque converters are used with this type of drives. Characteristics of the converters (Installment 23) are well adapted for this type of service. They provide a cushioning medium, which absorbs the shocks inherent in the operation of the rotary. They assure nearly constant speed of the engine regardless of the speed of the rotary. When resistance is encountered by the bit, the rotary table slows down, the torque is built up, while the speed of the engine remains practically unchanged. With resistance removed the table returns to the normal speed.

Fig. 32 shows a schematic arrangement of one type of independent rotary drive powered by an internal-combustion engine and equipped with a hydraulic torque converter. The unit consists of a high-speed internal-combustion engine with converter mounted directly onto the flywheel housing of the engine, and with a chain drive from the output shaft of the converter to the input shaft of the transmission. The transmission, which in this case has two forward speeds and one reverse, is connected to the pinion shaft of the rotary table by means of a flexible coupling. An inertia brake on the input shaft of the transmission stops the rotation of the converter and the transmission when the engine throttle is closed. The engine throttle is operated by the driller through a pneumatic control. Fig. 33 gives the performance characteristics of a typical installation.

The unit considered here is limited to engines operating at speeds above 1,400 r.p.m. When a larger power unit is needed, operating at a slower speed, the converter is mounted separately from the engine and is driven from the engine with a chain. This furnishes the necessary increase in the input speed of the converter. Arrangement between the converter and the rotary remains essentially unchanged.

Hydraulic torque converters operate at maximum efficiency through a certain speed range. The ratios of such rotary drive units are therefore designed to give certain operating range of the rotary table (for instance from 50 to 200 r.p.m.) while at the same time keeping the converter within its efficient speed. The operating range may be changed by changing the sprocket on the input shaft of the transmission.

Kelly Bushings and Kellies

With present emphasis on accuracy of the rate of feed off, to maintain uniform weight on bit, the smooth and free passage of the kelly through the rotary table becomes a problem of considerable importance. Roller - kelly - drive bushings, eliminating friction on the kelly, are one of the solutions. Rollers are sufficiently large to assure a satisfactory area of contact with the kelly joint and are provided with a lubricating system.

As a tool which imparts the rotary motion to the drill pipe and must also support the pipe string, the kelly joints are subjected to very severe demands under the conditions of present-day drilling. These demands have been met by improved materials and manufacturing methods. Also increasing use is being made of hexagonal kellies, which provide considerably larger circulation area, offer more resistance to bending, and are stronger in torque and in tension than comparable square kellies.

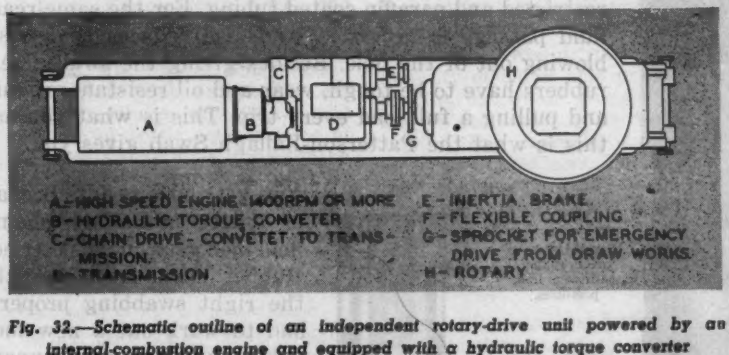

Fig. 32.—Schematic outline of an independent rotary-drive unit powered by an internal-combustion engine and equipped with a hydraulic torque converter

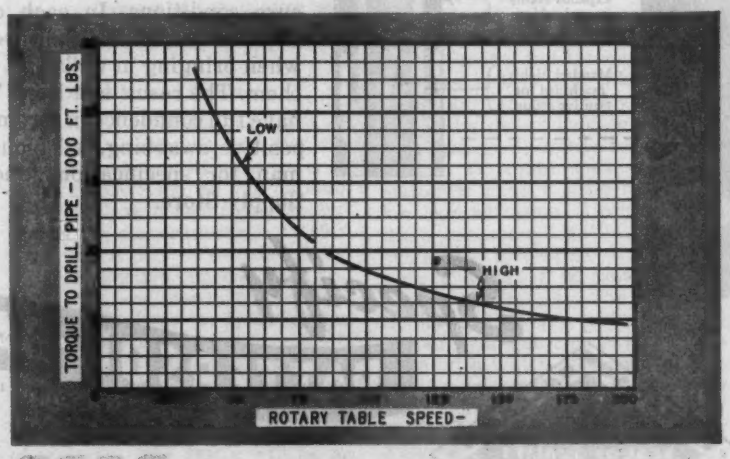

Fig. 33.—Performance characteristics of a hydraulic-converter-equipped internal-combustion-engine, rotary-drive unit

No. 33 in a series by Joseph Zaba, petroleum engineer, Houston

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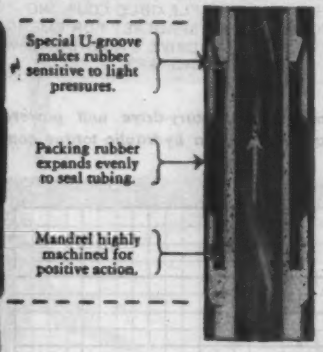
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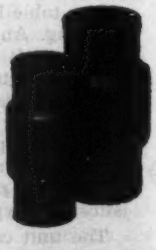

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ENGINEERING fundamentals

Measurement and Control of pH

This is the first of several articles which will cover both the theoretical and practical aspects of pH (hydrogen ion) tests.

MOST engineers in industry today have at one time or another come in contact with the term "pH" and doubtless many of them have a general understanding of its meaning and use. The purpose here is to call attention to some of the aspects of the subject, which are not always understood and weighed in proportion to their importance; particularly when automatic pH control is being considered. However, before automatic pH control is discussed, it may be wise to review the fundamentals of the subject, and thus see the source of the pitfalls which so frequently upset what appears to be a good application of pH control.

The general classification of substances, according to their acidic or basic properties, is familiar to all, and it is well known that acids and alkalies are important factors in chemical and biological processes.

Development of the pH scale is based upon the electrolytic dissociation theory of Arrhenius. According to this theory, an acid or an alkali when dissolved in water, dissociates or breaks up into ions which are atoms or groups of atoms, carrying positive or negative charges of electricity. The presence of these positively and negatively charged ions is explained by the electronic theory, or the concept of the atom.

Hydrogen ions and hydroxyl ions are liberated in solutions by the dissociation of acids and bases. Hydrochloric acid, HCl, dissociates to HCl H Cl. Acetic acid dissociates to H CCOOH H H CCOO. Sodium hydroxide dissociates to Na OH Na OH. From above it will be noted that acids, regardless of whether they be weak or strong, liberate, through their dissociation, free hydrogen ions carrying positive charges. According to this theory, therefore, an acid may be defined as a substance which yields hydrogen ions in solution, and a base may be defined as a substance which yields hydroxyl ions in solution.

All acids, however, do not possess the ability to dissociate to the same extent, and this accounts for the differences in activity of various acids. A similar condition is true of bases. Hydrochloric, nitric, and sulfuric acids are almost completely dissociated into ions when in solution, while acetic acid is dissociated to a small extent. For example, a solution of sulfuric acid and one of acetic acid may be of the same strength, as measured by their ability to neutralize an alkali, yet a tremendous difference would exist in their hydrogen ion concentration. The importance of controlling ion concentration is obvious in reactions when specific conditions are to be maintained.

When pure water ionizes, equal numbers of hydrogen and hydroxyl ions are formed and thus pure water is termed neutral. It dissociates as follows: $H_2O = H + OH$.

Dissociation Constant

Through extensive research, it has been established that the dissociation constant of pure water at 22° C., expressed as the product of the hydrogen ions times the hydroxyl ion concentration is 1×10^{-14}. From this it may be calculated that the hydrogen ion concentration and hydroxyl ion concentration are each equivalent to 1×10^{-7} gram ions per liter.

When an acid is mixed with pure water, hydrogen ions will form from both the dissociation of the water and from the dissociation of the acid. The result will be an excess of hydrogen ions and the solution assumes an acid reaction. If an alkaline substance is dissolved in pure water the number of hydroxyl ions will increase. The product of the two ion concentrations must remain constant; therefore an increase in either hydrogen or hydroxyl ions is compensated for by a decrease in hydroxyl or hydrogen ions.

Prior to the time of hydrogen ion measurement, the acidity or alkalinity of a solution in a process was sought through quantitative measurement of the amount of standard acid or alkaline solution required to neutralize the given process liquor. Out of this method there developed such expressions as "slightly acid," "slightly alkaline," "strongly acid," "strongly alkaline," to indicate the type of solution involved. The possible errors due to the human element in this method of control are obvious to everyone.

Litmus paper was also used to indicate acidity or alkalinity, but proved to be totally misleading and ineffective to differentiate between strong and weak acids.

Titration would indicate the quantity of either acid or alkaline present, but would give no indication of the intensity or degree of acidity. For example, a solution of hydrochloric acid and a solution of boric acid of the same strength as determined by titration, vary tremendously in activity when considered from the point of view of intensity of their reactions.

Since hydrogen and hydroxyl ion concentration are of so much importance and general interest, it is desirable to have a reproducible and mutually understood unit of measurement, and inasmuch as the effective acidity and alkalinity of a solution can accurately and definitely be determined in terms of hydrogen or hydroxyl ion concentration, it would seem a simple matter to have a scale reading in ion concentration. Unfortunately, there are some significant inconveniences associated with using such a scale of measurement of acidity or alkalinity. The chief difficulty is that the ion concentration of hydrogen ions in most solutions with which we come in contact is extremely small, and this would have to be expressed in very small decimal numbers such as 0.0000001, the concentration of hydrogen ions in neutral water.

Contribution from Southern California Meter Association. Author: N. E. Swanson, Los Angeles, Foxboro Co.

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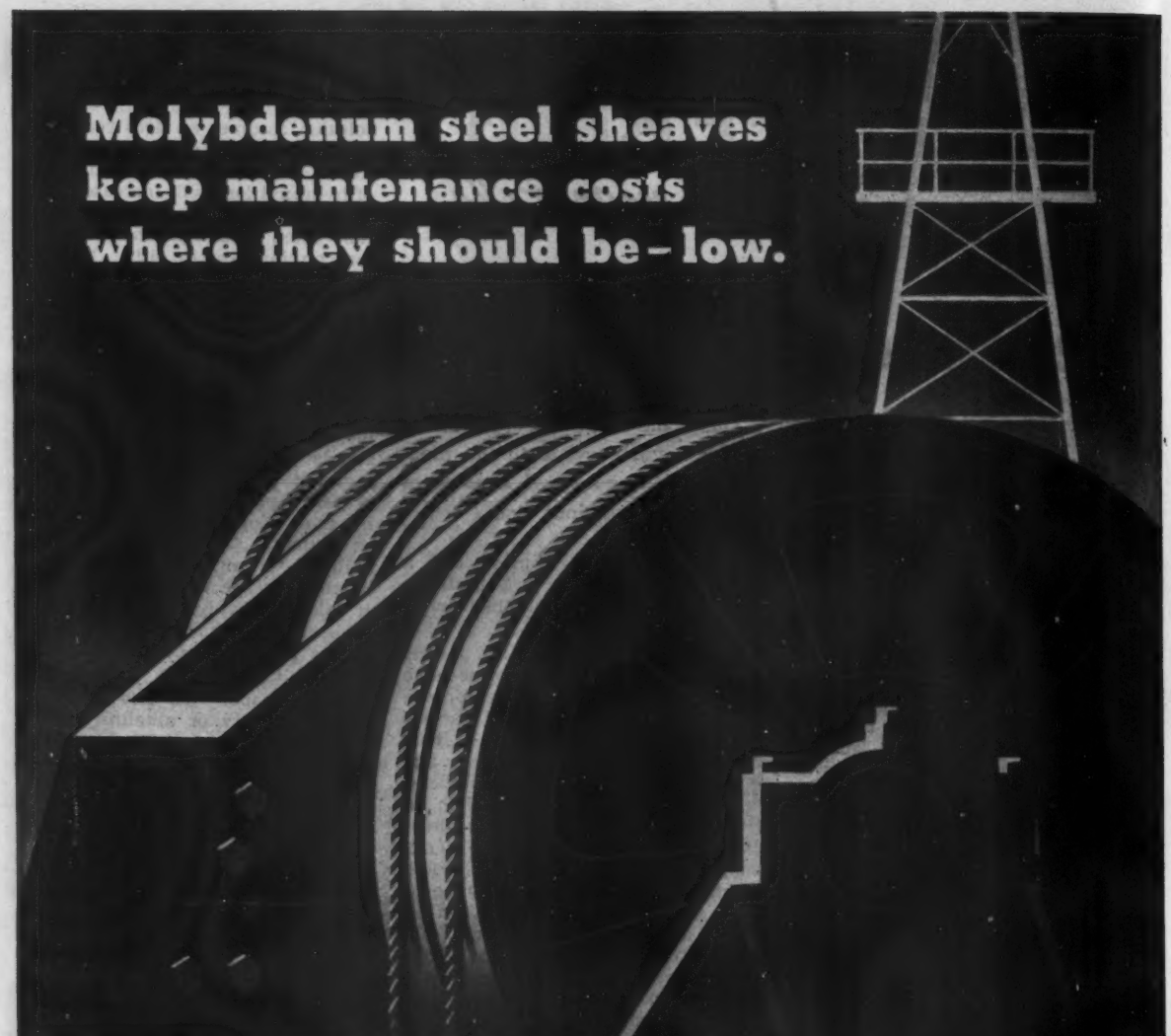

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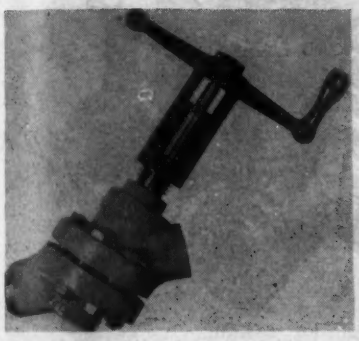
IT'S NEW CHECK IT

by John M. Spears



(1) CLYDE VALVES provide streamline fluid flow. Valve body is essentially a flanged union with standard bolt centers, the flange set at 45- to axis of flow. A stainless steel seat forms the ground joint between the two flanges. Either body can be removed readily with its pipe section which is threaded or welded to the body. A large number of valve combinations can be assembled from a few standard parts. For example, the globe valve and the check valve use the same bodies except that the bonnet details are replaced by a poppet-type valve. Other combinations are easily obtained. *Balmer Corp.*

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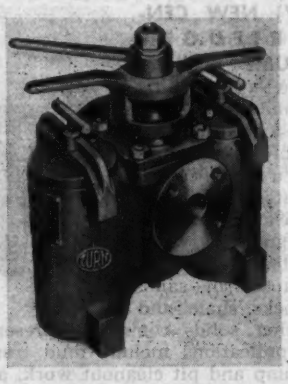
(2) TWIN SEDIMENT STRAINER is an economical strainer in pipe lines where continuous flow is imperative. When strainer is to be cleaned, flow can be diverted from one basket to the other without interrupting passage through strainer. Unit operates by means of a single plug-type valve whose orifices direct flow from inlet to either basket, or both simultaneously. Seating of plug into body is regulated by the relieving yoke which acts to seat the plug tightly for sealing, or to loosen it for turning, as required. Dual air-relief valves, available with flanged or screwed connections, are suitable for working pressures from 125 to 300 lb. *J. A. Zurn Mfg. Co.*



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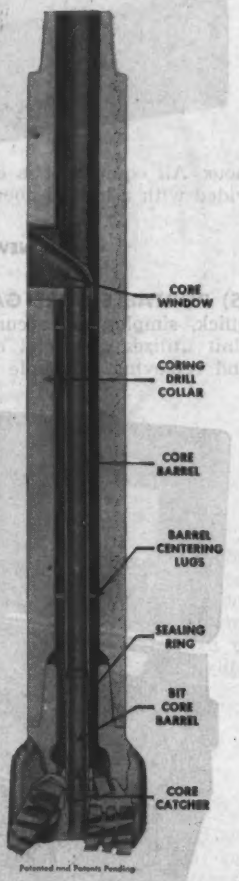
(3) NEW CORING BIT obtains bottom-hole core sample with every bit run. When drilling, coring bit is ordinarily run until dulled at which time a core sample of the last 3 ft. of hole made is retained in the core barrel for inspection when bit is brought to surface. However, bit can be pulled any time a core sample is desired. Bit contains a fixed, short core barrel which extends from core opening in the bridge to the end of the tool-joint pin on the bit. This short core barrel contains a spring-type floating core catcher which is retained within the barrel and is not a loose part of the assembly. Coring drill collar has an outside diameter and bore the same as the standard tool-joint connection for the bit size. Drill collar retains the core barrel which is centrally located within the bore and is threaded into the core breaker cage located near the top of drill collar. Core breaker cage is a fixed part of the drill collar and is sealed off from the downward mud stream within the collar. Cage forms a lateral opening or core window between core barrel and the space between drill collar and walls of the hole. Lower end of core barrel has a socket connection which slips over the short, fixed section of core bar-



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rel located in the bit. This forms a continuous core tube when the bit is made up to the drill collar. *Security Engineering Co., Inc.*

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(4) RECTICHARGER maintains constant d.c. voltage output to telephone switchboard regardless of line fluctuations, and may be used in connection with cathodic protection of pipe lines. Battery is maintained at given cell voltage so that it never becomes overcharged or undercharged. Unit has 95-130-volt 60-cycle input, capacity 11 to 12 cells, 3 amp. continuous. All equipment is enclosed in a steel cabinet provided with a hinged door. *Electronic Supplies.*

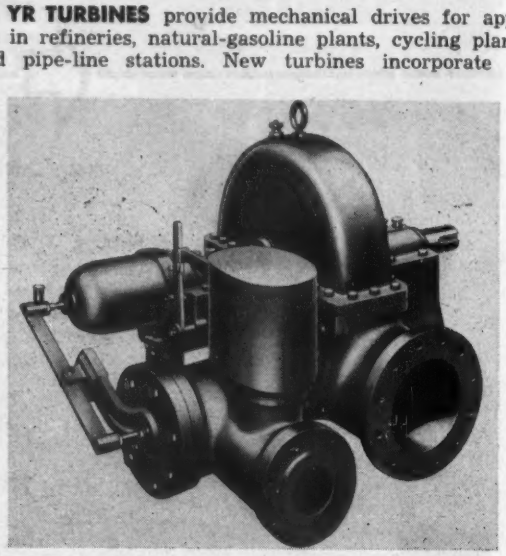
IT'S NEW CHECK IT

(5) PORTABLE CORE GAS ANALYZER provides a quick, simple, and accurate core analysis in the field. Unit utilizes a special extraction chamber for cutting and removing a sample from the core to be analyzed.

When core sample is obtained from core to be analyzed and placed in extraction chamber, even a minute quantity of gas present is measured and immediately indicated. Although the amount of the gas may be too small to burn openly, if there is gas present at all, it will be in sufficient quantity to create a thermal-combustion effect across the sensitive platinum element of the instrument, which is used as a catalyst and which thus effects an electrical bridge circuit. Readings are taken direct from the gas volume meter of the unit. *Petroleum Instrument Co.*

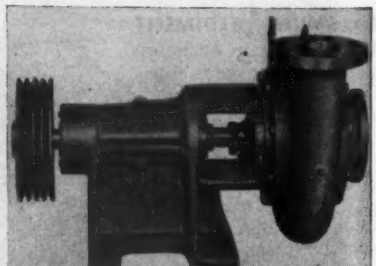
IT'S NEW CHECK IT

(6) YR TURBINES provide mechanical drives for apparatus in refineries, natural-gasoline plants, cycling plants, and pipe-line stations. New turbines incorporate increased capacities (up to 2,000 hp.), high allowable back pressures (through 250 psig.), high operating speeds (through 6,000 r.p.m.), and increased flexibility. Units may be installed outdoors by sealing the bearings and enclosing the governing parts. Maintenance costs have been reduced by standardizing and simplifying parts. *Elliot Co.*



IT'S NEW CHECK IT

(7) NEW CENTRIFUGAL PUMP handles rotary drilling mud and other particularly abrasive fluids. Pump incorporates numerous features designed to withstand wear caused by sand, rocks, shale, and other solids commonly present in oil-field operations. Applications include mud transfural and mud loading, sump and pit cleanout work, and as a booster pump for the regular rig mud pumps. Unit is a heavy-duty, slow-speed centrifugal and is adptable to either V-belt or direct drive. *Vernon Tool Co., Ltd.*



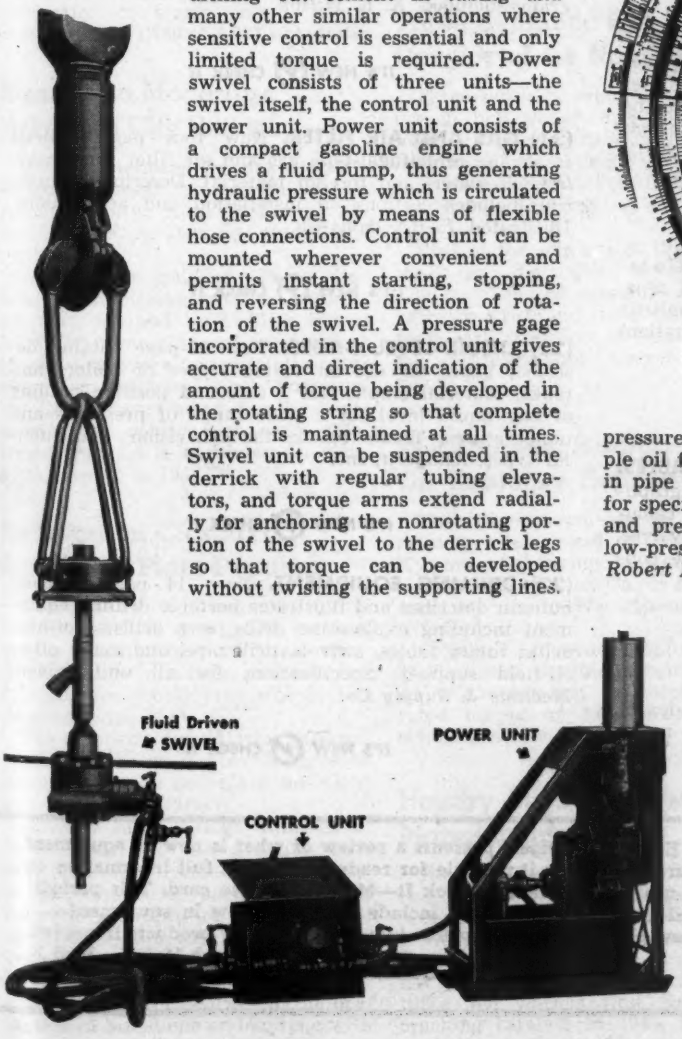
IT'S NEW CHECK IT

(8) LOG-O-GRAF provides an entirely automatic and continuous record of rate of penetration of drilling bit in the formation. Strip-type chart is graduated in inches and tenths of an inch to conform to an electrical log. No replotting is necessary, since all changes in lithology in the form of a curve are recorded as drilled. This information, which is indicative of the degree of porosity and permeability of formations, is immediately available

for correlation. Instrument is mounted on the derrick floor where it can be observed constantly by the driller. Method employed makes use of a small steel line which is attached to swivel and is threaded over a sheave just below the crown block, then to the driving sheave of the instrument, then to a sheave below the thrible board where it is connected to a dolly which rides up and down a guy wire of the derrick. *Warren Automatic Tool Co.*

IT'S NEW CHECK IT

(9) FLUID-DRIVEN POWER SWIVEL permits light rotating jobs to be carried out on a rig without need for installing kelly, rotary table, or other heavy equipment. Typical applications include internal cutting and fishing jobs, drilling out sand or cement bridges, scraping liners, drilling out cement in tubing and many other similar operations where sensitive control is essential and only limited torque is required. Power swivel consists of three units—the swivel itself, the control unit and the power unit. Power unit consists of a compact gasoline engine which drives a fluid pump, thus generating hydraulic pressure which is circulated to the swivel by means of flexible hose connections. Control unit can be mounted wherever convenient and permits instant starting, stopping, and reversing the direction of rotation of the swivel. A pressure gage incorporated in the control unit gives accurate and direct indication of the amount of torque being developed in the rotating string so that complete control is maintained at all times. Swivel unit can be suspended in the derrick with regular tubing elevators, and torque arms extend radially for anchoring the nonrotating portion of the swivel to the derrick legs so that torque can be developed without twisting the supporting lines.



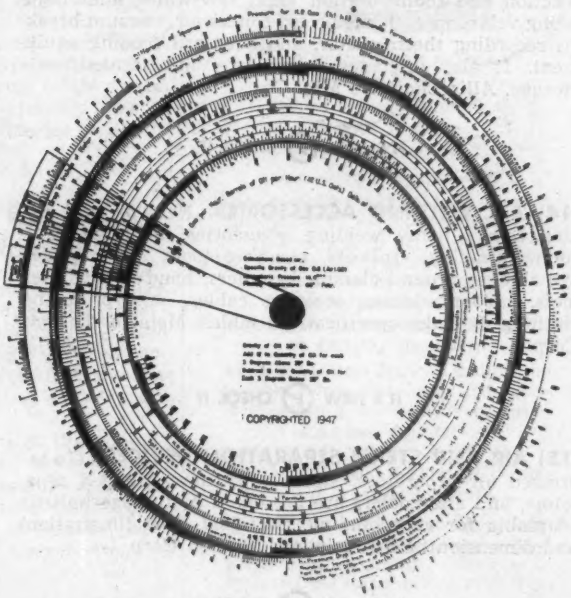
OIL AND GAS EQUIPMENT Digest

IT'S NEW CHECK IT

Swivel and fluid-drive unit are integrally combined into one compact housing and the lower end of the swivel connects directly to the run-in string. *Baash-Ross Tool Co.*

IT'S NEW CHECK IT

(10) FLUID TRANSPORTATION CALCULATOR aids the engineer in solving his pipe-line problems by up-to-date methods whether they be in gas, oil, or water. Calculator will solve problems in high-pressure gas pipe-line flow by Panhandle formula or Weymouth formula; low-



pressure gas pipe-line flow by Spitzglass formula; simple oil flow by National Transit formula; flow of water in pipe line by Spitzglass formula; and give corrections for specific gravity in gas, pressure base in gas problems, and pressure drop for interval distribution in high or low-pressure gas or water systems. Printed on Vinylite. *Robert M. Hutchison.*

IT'S NEW CHECK IT

(11) SAND SAMPLE ENVELOPES and core boxes provide handy and economical containers for sample shipment and storage. Envelopes are specially designed for easy opening for filling yet are sturdy at seams and corners and contain adequate space for samples. Opening is fitted with flexible metal tie. Core boxes provide ample storage for envelopes and are knocked down for flat shipment and storage. *Tulsa Paper Co.*

IT'S NEW CHECK IT

TRADE LITERATURE

(12) HIGH VACUUM APPARATUS. New 48-page bulletin points out factors to be considered in choosing and operating vacuum equipment, and lists manufacturer's high-vacuum pumps and pump accessories. Illustrations and tabulated data accompany material. *Central Scientific Co.*

IT'S NEW CHECK IT

(13) WATER-CONDITIONING SYSTEM. Essential function of a hot-process water-conditioning system is explained and diagramed in new 12-page bulletin. Included is a description of the equipment and an explanation of what it is designed to do, together with the mechanism of its operation. Bulletin tells of the system's reaction and sedimentation tank, raw-water inlet regulating valve, spray heater, vent condenser, vacuum breaker, recording thermometer, and chemical feeding equipment. It also discusses condensate and treated-water storage. *Allis-Chalmers Mfg. Co.*

IT'S NEW CHECK IT

(14) ARC-WELDING ACCESSORIES. New pictoral catalog covers many welding accessories including cable connectors, lugs, splicers, cleaning tools, cover plates, eye shields, ground clamps, hammers, hand shields, helmets, holders, lenses, welding cables, and protective clothing. Includes specifications tables. *Metal & Thermit Corp.*

IT'S NEW CHECK IT

(15) AIR AND STEAM SEPARATION DEVICES. Compressed air separators, steam separators, flanged separators, and aftercoolers are presented in 10-page bulletin adaptable for ring binding. Sectional flow illustrations and dimension tables included. *Johnson Corp.*

IT'S NEW CHECK IT

(16) ENGINEERING DATA AND REFERENCE TABLES. New two-color bulletin presents a compendium, in graphical and tabular form, of handy information for calculations on piping, pumps, heaters, traps, reducing valves, temperature regulators, pump governors, pressure controllers, and other plant equipment. *Leslie Co.*

IT'S NEW CHECK IT

(17) CORROSION-RESISTANT EQUIPMENT. Index of 15-page color booklet lists 28 corrosion-resistant materials and equipment used in handling corrosives. Illustrations and descriptive material accompany each item. *U. S. Stoneware Co.*

IT'S NEW CHECK IT

(18) STREAMLINED TOOLS. An 80-page 2-color catalog contains description and illustrations of guaranteed line of tool sets and individual tools for every oil country use. May be used as reference guide for many hand tools. *Plomb Tool Co.*

IT'S NEW CHECK IT

(19) COMET BATTERY CHARGER. Color leaflet describes and illustrates portable battery charger for reliable, quick charging. Covers unit equipped with battery analyzer which shows condition of battery. Includes prices for two sizes. *Comet Battery Charge Co., Ltd.*

IT'S NEW CHECK IT

(20) INDUSTRIAL POWER UNITS. Power units for many oil and gas applications are covered in eight-page, two-color bulletin with attached price list. Stresses dependable service of units which operate on gasoline, natural gas, or bottled gas. Illustration and layout diagrams included. *K. R. Wilson.*

IT'S NEW CHECK IT

(21) GAS AND AIR FILTER. New four-page bulletin treats the centrifugal-type gas and air filter for removing oil, water, and foreign material. Descriptive material includes sections on installation and applications. Illustrated. *R. P. Adams Co.*

IT'S NEW CHECK IT

(22) LIQUID-LEVEL GAGES. New 32-page catalog describes gages for use on various types of boilers and tanks. Material emphasizes a safe and positive reading of any liquid level for a wide range of pressures and temperatures. Treats reflex, through-vision, and tubular types. *Klingerit, Inc.*

IT'S NEW CHECK IT

(23) DRILLING EQUIPMENT. New 14-page 2-color bulletin describes and illustrates portable drilling equipment including exploration drills, core drills, shot-hole drills, rotary tables, swivels, drill pipe, and many other oil-field supplies. Specifications for all units given. *Machine & Supply Co.*

IT'S NEW CHECK IT

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

Keep Informed. Save Time. Tear Out Card. Check It. Mail It.

REFINING

Viscous-Neutrals Output Shows Increase in June

Production of viscous neutrals by Mid-Continent refiners increased at the rate of 845 bbl. daily in June with an average daily output during the month of 17,416 bbl.

Production of bright stock, however, fell from a daily average of 9,129 bbl. in May to 8,533 in June. Figures, compiled by the Western Petroleum Refiners Association, are based on the operations of 13 companies.

Production of paraffin oils increased during June from 2,518 bbl. daily to 3,004 bbl. daily; output of blended oils increased from 17,689 bbl. daily to 18,229 bbl. daily; and production of steam refined stock dropped from 1,186 to 1,064 bbl. daily.

Kanotex to Modernize Arkansas City Refinery

Kanotex Refining Co. has completed arrangements for modernizing its Arkansas City, Kans., refinery, according to F. A. Deering, general superintendent.

The program includes a Perco catalytic desulfurization-catalytic reforming unit, licensed by Phillips Petroleum Co.; revamping and enlargement of vapor-recovery and catalytic polymerization facilities. Koch Engineering Co. has contracted for the engineering and construction work. The entire program is scheduled for completion early in 1948.

Decision on Closing of Butadiene Plant Pending

Decision by Southern California Gas Co. officials is reported pending on the question of a complete shutdown of the butadiene plant it has operated for the Government in Los Angeles since 1943.

The company July 31 was directed by the Office of Rubber Reserve to cease production and place the plant in a standby condition.

In view of the large volumes of chemical intermediates available, surveys have been conducted among interested industrial parties to determine the possibility of continuing the operation as a private enterprise. The company may operate the plant this winter for standby gas production.

The plant was converted to the production of butadiene and styrene with the expenditure of $12,500,000 of federal funds and at peak capacity produced 85 tons of butadiene a day.

Advance Refining High Bidder For Royalty Oil

Advance Refining Co. of Centralia, Ill., was high bidder for 75,000 bbl. per month of royalty oil being sold by the Government from Rangely field in Colorado.

Advance bid 15 cents per barrel above the prevailing price. Secretary of Interior J. A. Krug is to award the contract soon. Preference was to be given small refineries without adequate crude supply.

Three Synthetic Oils Developed for Navy

Three synthetic oils, for U. S. Navy use in ball, roller, and jewel bearings of delicate instruments, have been developed through research carried out at the Mellon Institute for Industrial Research at Pittsburgh, Pa.

Two of the oils are of the spreading type; the other, nonspreading. The development research was done between 1942 and 1946 under contract with the Navy to discover better lubricants for aircraft instruments.

WAA Opens Bidding On Kentucky Refinery

The Government-owned gasoline refinery 3 miles south of Catlettsburg, Ky., operated during the war by Ashland Oil & Refining Co., is being offered for sale by War Assets Administration.

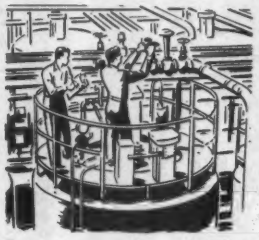
Bids will be opened September 12. The refinery, capable of being adapted to independent operation, has a rated output of 3,800 bbl. of 100-octane gasoline a day.

Houdry Buys Catalyst Manufacturing Plant

Houdry Process Corp. has purchased the modern catalyst manufacturing plant at Paulsboro, N. J., from War Assets Administration.

The plant, a duplicate of the original Houdry plant which manufactured the world's first commercial cracking catalyst in 1940, has been

With
PETRECO
DESALTING
more profitable operations
don't "just happen!"



When an appreciable increase in *Refining Capacity* follows the installation of a *Petreco Desalter* it's not a coincidence . . . *it is planned and expected.*

Long experience with many desalters, in many refineries, has shown that the

ELIMINATION OF SALT PLUGGING
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CURTAILMENT OF HARD COKING
ELIMINATION OF SCALING

And LOW SALT CONTENT CHARGES TO CRITICAL EQUIPMENT

which result from Petreco Desalting, invariably reduce shut downs and equipment failures so that the refinery gains by

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These benefits to operations are very significant, but they don't "just happen." These benefits, and the efficiency of Petreco Desalting result directly from

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5. Special desalting equipment available from Petreco stock.
6. Construction supervision to direct erection of desalter.
7. Continuing equipment modernization through the development and addition of new equipment refinements.

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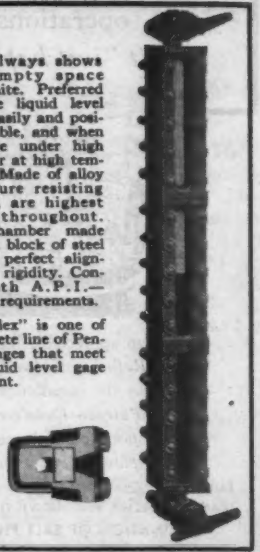

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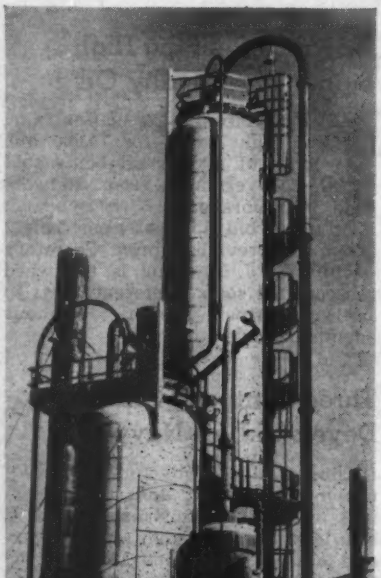
operated by Houdry under lease from the Government since 1942.

High Ethylene Recovery Found in New Process

Recovery of more than 96 per cent ethylene through a newly developed commercial-hypersorption process has been reported by Union Oil Co. of California, which developed the process.

In charging 76,900 standard cubic feet per hour of mixed gases, composed mainly of hydrogen, methane, nitrogen, and but 5.7 per cent ethylene, the unit is now recovering 7,000 to 7,500 lb. per day of ethylene.

The unit was designed and fabricated by Foster Wheeler Corp.



Two new refinery towers using stainless-clad steel in their construction are now in service at the Shell Oil Co., Inc., refinery at Martinez, Calif. The towers were fabricated by C. F. Braun Co. and the stainless clad plates were furnished by Jessop Steel Co., Washington, Pa. The shorter tower is 10 ft. in diameter and 30 ft. high and is built entirely of stainless-clad plate, 1¼ in. thick, using Type 405—10 per cent clad. This flash column operates at 110 psi. and 900° F. The taller tower, a fractionating column, is 10 ft. in diameter and 55 ft. high, and is made of ⅞-in. plate. The upper portion of the tower is constructed of regular firebox-quality plate and operates at 100 psi. and of 800° F. The bottom portion, to a height of 30 ft., is made of stainless-clad plate, with Type 405—15 per cent clad, and operates at 100 psi. and 800° F. These columns were X-rayed and stress relieved and were required to have a joint efficiency of 95 per cent

More Synthetic Rubber Plants Will Be Closed

As part of a plan to reduce the regional output of synthetic rubber, either the Houston butadiene plant operated by the Sinclair Oil Co. or the Lake Charles plant operated by Cities Service Co. will be closed down soon, Rep. Albert Thomas said in Washington last week.

The Neches plant at Port Neches may also be reduced to one-half capacity as part of the plan.

Of the 51 synthetic-rubber plants producing during the war, the Government plans to keep only 29 plants with a capacity of 600,000 tons of synthetic rubber annually in standby condition.

J. O. C. Brown, plant superintendent for Sinclair, said the Houston plant is now operating at about 50 per cent capacity but would not shut down until instructed to do so.

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PIPE LINES

Early Start Planned By Michigan-Wisconsin

MICHIGAN - WISCONSIN PIPE LINE CO. is endeavoring to commence construction of its 1,069-mile system by January 1, 1948. Since arrangements for delivery of pipe for that date have not yet been completed, the company is hopeful of obtaining sheet steel for fabricating the pipe.

All of the conditions required by the Federal Power Commission have been met except that requiring construction to begin "not later than January 1, 1948."

Aerial survey is now in progress, and contracts have been executed for certain engineering and construction materials. Ford, Bacon & Davis, Inc., has contracted for construction.

The order as supplemented, provides that Panhandle Eastern Pipe Line Co. shall be permitted to deliver natural gas to Michigan Consolidated Gas Co. in accordance with existing contracts, and upon their termination shall be afforded reasonable opportunity to sell to Michigan Consolidated not less than the annual volumes of gas sold by it for either the years 1942 or 1945 or the average delivered for the 5-year period, 1942 through 1946.

In addition, Panhandle Eastern shall have an opportunity to deliver volumes of gas to Michigan-Consolidated as the latter may request in excess of volumes contracted by it from Panhandle Eastern and Michigan-Wisconsin in order to maintain adequate service in these districts.

Michigan Consolidated has offered to contract with Panhandle Eastern for purchase of 32,000,000,000 cu. ft. of natural gas annually for 15 years beginning January 1, 1952, but Panhandle Eastern has not accepted this offer.

Michigan-Wisconsin has contracted with Phillips Petroleum Co. for natural gas from Hugoton field. Gas reserves controlled by Phillips Petroleum Co. and dedicated to Michigan-Wisconsin are estimated to be sufficient to furnish the proposed pipe line a supply of gas averaging 100,000,000,000 cu. ft. per year for approximately 25 years.

Michigan-Consolidated has entered agreements with Michigan-Wisconsin to purchase natural gas and to lease facilities. The proposed line will be operated in conjunction with Austin field and the other storage fields of Michigan-Consolidated. Michigan-Wisconsin has also entered into agreements with Milwaukee Gas Co., Madison Gas Co., Maryville Electric Light & Power Co., Iowa Southern Utilities Co., Wisconsin Power & Light Co., and Wisconsin Public Service Corp. to supply natural gas. It is expected that the pipe line will also serve additional markets along the right-of-way in Missouri, Iowa, Wisconsin, Indiana, and Michigan.

The Michigan - Wisconsin project will be built of several sizes of pipe. From Hansford County, Texas, to Millbrook, Ill., referred to as "Wisconsin Junction," there will be 810 miles of 26-in. From there, a 250-mile, 22-in. line will extend to the

Pumping unit operating at Hearne station, Texas, on Humble Pipe Line Co.'s butane line from East Texas to the Gulf Coast. This butane line station is located near the grounds of Humble's main-line crude-oil pump station. The butane pumping unit is constructed so that the centrifugal pump is outside the building, under a shelter that is open on three sides

CRC

PIPE LINE CONSTRUCTION EQUIPMENT

CRUTCHER-ROLFS-CUMMINGS
Pipe Line Equipment and Materials
Houston-Tulsa

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Pipe Line Contractors and Engineers
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above all EXPERIENCE

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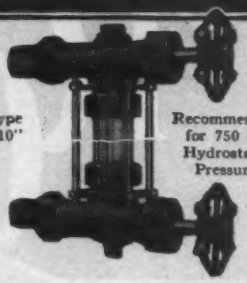
PIPE LINE SPECIALISTS

PENBERTHY
DROP FORGED STEEL
LIQUID LEVEL GAGES



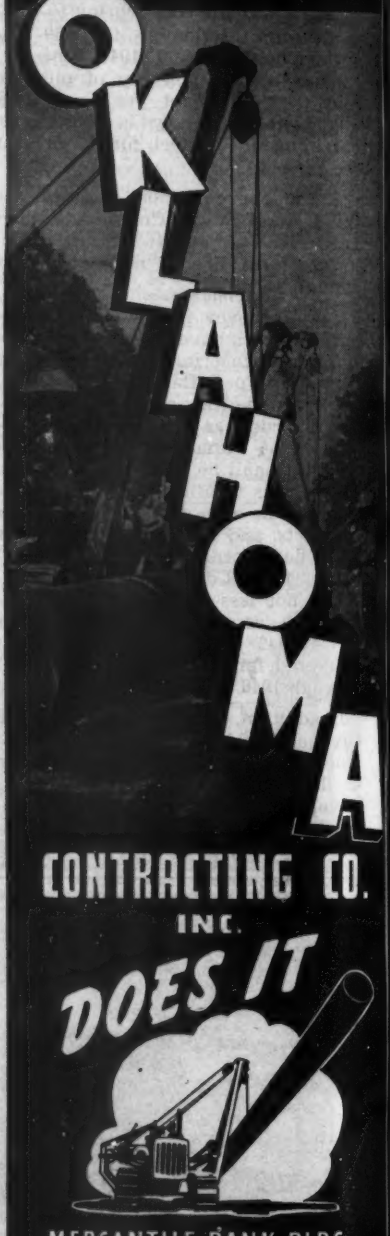
Steel construction throughout with stainless steel interior trim. Automatic shut-off is positive and instantaneous; stainless steel balls shut off the flow of liquid when glass breaks. Heavy duty stuffing boxes, union connections, offset construction facilitate cleaning and simplify glass replacement. Conform with A.P.I.—A.S.M.E. requirements.
This is one of the complete line of Penberthy gages that meet every liquid level gage requirement.

PENBERTHY INJECTOR CO.
DETROIT, MICH. Canadian Plant WINDSOR, ONTARIO

Austin storage field in Michigan. From Wisconsin Junction, a 110-mile, 22-in. line will extend to a point near Milwaukee referred to as "Milwaukee Junction." An 11-mile, 18-in. line will deliver to the Milwaukee area; a 59-mile, 14-in. line will extend to a point near Appleton, Wis.; branches from the 14-in. line will extend to Sheboygan, Fond du Lac, Oshkosh, Manitowoc, Two Rivers, Appleton, and Green Bay, Wis. Lateral connections will consist of the 12-in. line to Racine and the 10-in. line to Madison from Milwaukee Junction. Altogether, the branch lines serving Wisconsin will total 422 miles.

To connect the main pipe-line system with the various distribution systems of Michigan-Consolidated, it is expected that Austin Field Pipe Line Co. will construct a 140-mile, 26-in. line from the Austin storage field in the Detroit district referred to as the "Austin-Detroit Line." Several branches will be built, including a 25-mile line to Ann Arbor, Mich., a 10-mile branch to Mount Pleasant, a 4½-mile line to the Grand Rapids district and a 22-mile, 24-in. line from the Austin field to the Reed City field connecting the two storage fields. Michigan-Consolidated now owns the Austin and Reed City storage fields in which it proposes to install additional facilities consisting of new wells and gathering lines.

IT HAS TO BE OK IF OKLAHOMA CONTRACTING CO. INC. DOES IT



MERCANTILE BANK BLDG.
DALLAS, TEXAS

Pipe-Line Transportation Of Motor Fuel Increases

The volume of motor fuel delivered from pipe lines during the first 5 months of 1947 showed a 10.7 per cent increase compared to the same period in 1946, while the volume of motor fuel turned into lines showed an increase of 13 per cent during the same period.

Fuel delivered from pipe lines totaled 91,404,000 bbl. during the 5-month period, according to figures of the Bureau of Mines, while 91,972,000 bbl. of fuel was turned into lines.

Motor fuel delivered from lines in May totaled 22,457,000 bbl., compared with 18,906,000 bbl. in April. Fuel turned into lines during May totaled 21,299,000 bbl., compared to 18,954,000 bbl. in April.

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Anchor Gasoline Co. Begins Pipe Line

Anchor Gasoline Co., Tulsa, has begun work on a $325,000 pipe line to run from Lewisburg field at Church Point, La., to Eola, 35 miles away. An additional $125,000 will be needed to revamp the Eola plant.

The new pipe line will move about 10,000,000 cu. ft. of gas daily, to be used for gas-lift purposes. The gas

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ENGINEERS & SURVEYORS
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SURVEYING & MAPPING

PIPE LINE SURVEYS

will then be reprocessed and 7,000,000 cu. ft. daily sold to Southern Carbon Co.

Chris Gay, office manager, said the company hopes to have the work completed within four to six months.

Skelly Laying Boggs Pool Outlet in Kansas

Skelly Oil Co. is laying a 10-mile, 4-in. crude-oil line from Boggs pool in Barber County, Kansas, to Sohio Petroleum Co.'s pipe line which gathers crude oil from Turkey Creek, Sun City, Skinner, and Lake City pools of the northwestern part of the country.

The new Skelly line will run due north of Boggs pool to connect with Sohio's line 4 miles west of Whelan pool.

26 Per Cent of 1946 Pipe Output Given Oil Industry

The petroleum industry received 26 per cent of the total shipments of pipe and tubular steel goods during 1946, according to figures compiled by the American Iron and Steel Institute.

Total tubular shipments during the year for oil and natural-gas uses were 1,225,425 net tons, slightly below the total of 1,228,642 tons shipped in 1940. Of the total, 716,424 tons went to jobbers, dealers, and distributors, while 419,995 tons went directly to the industry for construction purposes, and 89,006 tons went direct for other purposes.

Of the total of 4,633,231 tons of steel pipe and tubing produced by the steel industry in 1946, about 8 per cent, or 385,000 tons, was exported, the institute report said.

Largest category of shipments was that of seamless pipe, of which 760,786 tons, or 60 per cent of the various types of pipe and tubing, were delivered.

Pipe Now Being Salvaged For New Sunray Line

Sunray Oil Corp. is planning an early start on construction of its proposed 93-mile, 6-in. products pipe line from the company's Allen, Okla., refinery to Beckett, 5 miles south of Duncan.

The line will connect the Allen refinery with the aviation-gasoline refinery at Beckett, on which Sunray was high bidder in a recent War Assets Administration sale.

Pipe for the proposed project is now being salvaged from the Osceola, Iowa-Omaha, Neb., section of Great Lakes Pipe Line Co. through operations contracted by A. C. Holder Construction Co.

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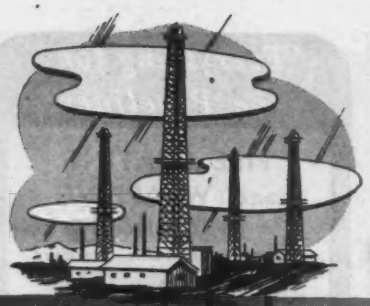

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P7-8

WORTHINGTON

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NATURAL GAS

T. G. T. C. Is Authorized Output Increased by FPC

TENNESEE GAS TRANSMISSION CO. has been authorized by the Federal Power Commission to construct and operate facilities to increase total capacity of its pipe-line system from 381,000,000 to 600,000,000 cu. ft. of gas per day.

Over-all costs, estimated at $53,542,835, will include construction of 191½ miles of 26-in. main pipe-line loops paralleling the company's main transmission pipe line extending south from a compressor station in Natchitoches Parish, Louisiana; approximately 300 miles of 26-in., 69 miles of 24-in. and 82 miles of 20-in. pipe-line loops paralleling the company's main pipe line north of the indicated compressor station; a new compressor station with 4,000 installed horsepower to be located in the Stratton-Agua Dulce gas field in Nueces County, Texas; an additional 73,400 hp. in existing or authorized compressor stations; about 83 miles of 20-in. transmission line from the company's system to Carthage gas field in Panola County, Texas; about 16½ miles of 6⅝-in. lateral transmission pipe line extending from LaReforma gas field in Starr County, Texas, to a connection with the San Salvador pipe-line extension of the company's system in Hidalgo County, Texas; and an aerial suspension-bridge pipe-line crossing over the Mississippi River between Refuge, Miss., and Shives, Ark., near Greenville, Miss.

The commission conditioned its order by requiring that facilities authorized shall not be used for the transportation or sale of natural gas to any new customers except upon specific FPC authorization.

Following are the daily allocations of gas effective upon completion of the projects: United Fuel Gas Co., 334,000,000 cu. ft.; Hope Natural Gas Co., 200,000,000 cu. ft.; Louisville Gas & Electric Co., 15,000,000 cu. ft.; Kentucky Natural Gas Co., 15,000,000 cu. ft.; and Tennessee Natural Gas Lines, Inc., 10,000,000 cu. ft. Through general distribution: Kentucky, 10,000,000 cu. ft.; Tennessee, 5,000,000 cu. ft. and Mississippi, 10,000,000.

Most of these customer companies have had increased demands for natural gas during the past winter and further increases are anticipated in the future years, particularly in the Appalachian area, where local production of natural gas is declining and consumer demands are increasing, the commission stated.

Hearing on Panhandle Eastern Proposals Set

A hearing on the application of Panhandle Eastern Pipe Line Co. to increase the capacity of its transmission system to 580,000,000 cu. ft. of natural gas daily will be conducted by the Federal Power Commission in Washington September 15.

Panhandle Eastern's petition asks authority to build about 356 miles of 26-in. loop lines and to install an additional 37,600 hp. in existing compressor stations. Total cost of the proposed projects is estimated at $23,464,000.

In announcing the hearing, FPC officials announced the postponement until August 27 of a hearing on the allocation of Panhandle Eastern's gas among purchasing companies this winter. This hearing originally was scheduled for August 18.

SEC Approves Sale of O.P.W. Gas Properties

Sale of the gas-utility properties of Oklahoma Power & Water Co. to Oklahoma Natural Gas Co. for $850,000 has been authorized by the Securities and Exchange Commission.

The sale was conducted to meet requirements of the federal Holding-Company Act, forbidding private utilities to engage in incidental business operations. The gas properties are located in Osage, Tulsa, and Pawnee counties, Oklahoma.

Sun Completes Plant; Begins Another

Sun Oil Co., which recently completed a $200,000 pressure-maintenance plant in Norwich field, Missaukee County, Michigan, has completed arrangements to build a $200,000 casinghead gas plant in Kimball Lake oil field near Newaygo, Mich.

Sun will supply natural gas service to Campbell, Wyant & Cannon Foundry Co. The foundry company will lay a 35-mile, $300,000 6-in. pipe line from Kimball Lake field to its Muskegon Heights and Norton Township plants, Ira A. Wyant, president, said.

The project is expected to be completed before the end of the year. The foundry company has been using about 700,000,000 cu. ft. of gas annually. Sun Oil Co. engineers estimate the gas potential of the Newago field at 3,000,000,000 cu. ft.

El Paso Natural Asks Expansion Authorization

El Paso Natural Gas Co. has requested Federal Power Commission authorization to increase its gas pipeline facilities to supply an additional 20,000,000 cu. ft. daily to Phoenix and Tucson, Ariz.

The project, to cost an estimated $3,323,000, is expected to be under construction by November 15. Gas supplies will come from gas now being flared to the air in the Permian basin in Lea County, New Mexico, and in West Texas, the company stated.

Natural Gasoline

Natural-Gasoline Output Registers Drop in May

Production of natural gasoline dropped 1,041,000 gal. daily during May to a daily average production of 14,013,000 gal. daily, compared with April's average daily output of 15,054,000 gal.

The Bureau of Mines survey showed that decreased production occurred in all districts except East Texas, Louisiana, New Mexico, Illinois, Wyoming, and California.

The May output was 585,000 gal. daily below the daily average output of 14,598,000 gal. for the January-May period.

Stocks at refineries climbed 10,416,000 gal., from 71,064,000 to 81,480,000 gal. during the month, but at plants and terminals dropped 12,008,000 gal., from 164,384,000 to 152,276,000 gal., a net decrease of 1,592,000 gal.

L.P.G. Short Course to Be Held at Tulsa University

A short course in liquefied Petroleum gases and appliances will be conducted Septembebr 3-5 at the University of Tulsa.

Subjects to be covered in the technical sessions include properties of proper venting, combustion principles, unloading procedures for tank cars and tank trucks, refrigeration, calculation of heat losses, and automatic control valves.

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Exploration and Drilling

Another Show in Southwest Kansas

SEVERAL operators evidently have confidence that somewhere in southwest Kansas, not too far from Hugoton gas field, oil will be found. As a matter of fact, small oil pools have been found a comparatively short distance northwest, north, and northeast of Hugoton field, namely Patterson, Nunn, and Shallow Water. Two or three wells along the Seward County, Kansas-Beaver County, Oklahoma line have found gas with some shows of condensate, and some occasional traces of oil.

Stanolind Oil & Gas Co. 1 Wheatley, NE NE SW 23-33-31w, in Seward County, Kansas, 15 miles east of Hugoton field, is the latest well to show some signs of promise, although it will be some time before the final story is in. This well topped the Lansing-Kansas City at 4,314 ft., datum —1,364 ft., and is now drilling in the Morrow, basal Pennsylvanian, at 5,561 ft., believed topped at 5,552 ft. The well was started with a test of the Mississippi scheduled, and may be drilled on into the Arbuckle, before final testing.

A drill-stem test at 4,435-55 ft. recovered 60 ft. of oil and gas-cut mud; a second test at 4,681-4,729 ft., regas-cut mud with a trace of oil; a third test at 4,847-4,913 ft., recovered 240 ft. of oil and gas-cut mud; a fourth, and the best to date, at 5,099-5,117 ft., recovered gas in 7 minutes (estimated 250,000 cu. ft.), 37 ft. of oil-cut mud, 2,690 ft. of oil (41°), and 810 ft. of salt water; the fifth test at 5,165-88 ft., recovered gas in 18 minutes (estimated 175,000 cu. ft.), and 125 ft. of oil and gas-cut mud.

Below these drill-stem tests, a soft zone was encountered with a slight show of oil at 5,388-93 ft., and a bleeding core recovered at 5,393-98 ft.

If Stanolind or some other operator does not eventually open some sizable oil accumulations in southwest Kansas, it will not be for lack of courage in drilling wildcats and testing geological and geophysical data.

SOUTHWEST TEXAS

New Pay Zone Discovered In Piedras Pintas Field

CORPUS CHRISTI.—A new oil pay zone for Piedras Pintas field, Duval County, has been opened by H. H. Howell 9 B. G. Parr, in J. Poitevent Survey 185. Top of pay was at 3,139 ft. Total depth is 3,496 ft., and production is through perforations at 3,152-57 ft. On potential test, the well flowed 240 bbl. of oil per day through a 3/16-in. choke, gas-oil ratio 600. Tubing pressure was 450 psi., and casing pressure 600 psi. Gravity is 44.2°.

In McMullen County, Shiner Ranch area, I. K. Howeth 2-A Annie Graves Dolph et al, wildcat, in H. Pressler Survey, Section 53, has been completed for 1 bbl. of oil per day on pump, no gas and no water. Top of pay is 1,386 ft., with total depth 1,398 ft. and production through open hole at 1,386-98 ft. This well is 6½ miles southwest of Ezzell field.

The Texas Co. 6 Yturria Land & Livestock Co., wildcat 8 miles northeast of Raymondville, in Willacy County, has set a cement retainer, apparently to plug back and sidetrack, after failing to recover fish at total depth of 16,006 ft. The well has 5½-in. casing set to 14,940 ft. in this hole, and reportedly was reaming down to set 4-in. liner to bottom at 16,006 ft. and perforate for a production test in a sand logged just above 16,000 ft. when drill collar was lost at 15,140 ft. Operators have been trying to recover the fish for several weeks with no success. If the well should make a producer near 16,000 ft., it would be a world's record.

Texas Co. 1 A. K. East, in Santo Domingo de Arriba Grant, has been completed as a gas well in a new shallow pay zone for the East field of Jim Hogg County. Drilled to a total depth of 4,975 ft., this well is completed through perforations at 3,955-59 ft.

Seaboard Oil Co. is testing a possible new pay zone for the Luby field of Nueces County. The 22 James Luby, a deepening job in an old well originally completed in the 5,061-66-ft. sand, was drilled to a new total depth of 7,009 ft. with 5-in. liner set on bottom. The new zone was perforated at 6,840-50 ft.

There were 26 locations reported this week of which 10 are wildcat starts, 4 in Starr, 2 in Duval, and 1 each in Bastrop, Jim Hogg, San Patricio, and Zapata. One new pay in Duval County, and one oil pool in McMullen County were opened this week while 6 wildcats were dry, 2 in Starr, and 1 each in Atascosa, Duval, San Patricio, and Zapata counties.

SOUTHWEST TEXAS SUCCESSFUL WILDCATS

Duval County: New oil pay Piedras Pintas—H. H. Howell 9 B. G. Parr, in J. Poitevent Sur. 185, top pay 3,139 ft., TD 3,496 ft., perf. 3,152-57 ft., IP: 240 bbl. oil per day through a 3/16-in. choke, gas-oil ratio 600, TP 450 psi., CP 600 psi., grav. 44.2°, no water.

McMullen County: New oil pool, Shiner Ranch area—I. K. Howeth (formerly Davenport) 2-A Annie Graves Dolph et al, in H. Pressler Sec. 53, 6½ mi. SW of Ezzell field, top pay 1,386 ft., TD 1,398 ft., open hole 1,386-98 ft., IP: 1 bbl. oil per day on pump, no gas, no water.

SOUTHWEST TEXAS WILDCAT FAILURES

Atascosa County: Pegg Bros. 1 Suzanna Pratt, in F. de la Garza Sur., 9 mi. W of Poteet, dry, TD 2,373 ft.

Duval County: V. G. Schimmel et al 1 Leopoldo Lopez et al, in T&NORR Sur. 6¼ mi. NE of Bruni, dry, TD 1,804 ft.

San Patricio County: Southern Minerals Corp. 1 W. T. Odem, in San Patricio de Hibernia Sur., 4 mi. W-NW of Edroy, dry, TD 6,312 ft.

Starr County: A. & T. Drilling Co. 2 Anna M. Kelsey, Block 16, Sur. 71, 20 mi. NE of Roma, 4 mi. S of Sacatosa gas field and 7 mi. NE of Margo gas field, dry, TD 1,122 ft.

Frank Doyno 1 Mary Headley Edgerton, Block 11, Share 66, Porcion 80 and 81, 7½ mi. N of Rio Grande City, dry, TD 1,226 ft.

Zapata County: Creslenn Oil Co. 1 Hermelinda Gutierrez, in A. Medina Sur. 591, 10 mi. NE of Zapata, dry, TD 3,403 ft.

EASTERN TEXAS

Marshall County Test Continues Drilling

DALLAS.—Stanolind Oil & Gas Co. 1 George Slaughter, 8 miles northeast of Marshall, reported slight shows of gas in cuttings at 8,912-24 ft., but continued drilling ahead below 9,111 ft. in sand after testing. A drill-stem test was attempted, in the Cotton Valley at 8,913-31 ft., but the tool plugged after being open 10 minutes. The recovery was 20 ft. of drilling mud. Flowing bottom-hole pressure was 3,200 lb. A second test at 8,915-50 ft. recovered 280 ft. of drilling mud with no shows.

In Wood County, 3¾ miles east of Yantis, Humble Oil & Refining Co. 1 Rio Oil Corp. had total depth at 8,510 ft. in hard sand and shale. A drill-stem test of the Pittsburgh formation at 8,265-85 ft., with packer at 8,243 ft., produced a good blow for 3 minutes, when the tool was closed to recover the bottom-hole pressure tool. Recovery was 9 stands of mud, with no shows. Operators squeezed perforations and prepared to test at 8,041-54 ft.

Sanders & Murchison 1 Sides, prospective Rodessa oil discovery in the Blackfoot section of Anderson County, was drilling ahead below 9,870 ft., and still looking for the Travis Peak. Operators reported top of the Pettit around 9,645 ft., and a formation break at 9,754-58 ft., which was said to have shown oil in the pits. The same operators' 1 R. F. Broadway, east of Blackfoot, had total depth at 9,906 ft. in sand and shale. Drilling mud was said to be showing gas. Top of the Travis Peak was logged at 9,870 ft., with no shows. Northwest of Slocum, Continental Oil Co. 1 F. M. Royall et al, was drilling ahead below 9,057 ft. in sand and shale.

In Freestone County, A. F. Richardson 1 Sessons, 5 miles east of Wortham, had total depth at 3,650 ft., and preparations were being made to test a show of oil in

the Woodbine at 3,306-16, 3,352-62 and 3,368-88 ft.

EAST TEXAS SUCCESSFUL WILDCAT

Navarro County: J. L. Collins & Co. 1 Mrs. Lillie Barnett, B. G. Balthorpe Sur., 2 mi. W Bazette, flowed an estimated 31,000,000 cu. ft. gas in 24 hours, open flow, bottom-hole flowing pressure 1,200 lb., rock pressure 1,170 lb., top Woodbine 3,222 ft., perforated 3,248-60 ft., TD 6,504 ft., PB 5,756 ft., set plug 3,600-3,453 ft.

EAST TEXAS WILDCAT FAILURES

Anderson County: Bluebird Investment Co. 1 J. I. Currey, John A. Box Sur., 6 mi. SW Elkhart, dry, TD 5,720 ft., Woodbine 5,682 ft. by sample.

Freestone County: C. L. Brown 1 Loraine Sneed, W. T. Lewis Sur., 4 mi. SW Fairfield, dry, TD 4,275 ft., no shows, base Austin 3,910 ft., Woodbine 4,256 ft.

TEXAS GULF COAST

Gas and Condensate Found in Bee County

HOUSTON.—A new gas-condensate discovery, Rowan & Hope 1 Rio Oil Corp., approximately 2 miles southwest of the Yoward field in northern Bee County, was gaged at 70,000,000 cu. ft. of gas per day on open flow, with a heavy spray of water-white condensate. Production is from the Slick sand, topped at 7,518 ft., with perforations at 7,530-50 ft. Total depth is 7,868 ft., with 5½-in. casing set at 7,860 ft. The well had tested good for gas-condensate production also at 7,841-68 ft. in the Massive Wilcox zone.

Sunray Oil Corp. 1 Geo. H. Brandt, new discovery in the North Weser area, approximately 1½ miles northwest of the Weser field, Goliad County, is in the process of dual-completion, making gas-condensate through perforations at 7,440-55 ft., and oil through perforations at 7,708-13 ft. Luling sand was topped at 7,707 ft. On a drill-stem test the well showed 30 bbl. of oil in 15 minutes through ¼-in. choke, top and bottom. The oil is 31.4° gravity. Total depth is 8,513 ft. Sunray is staking another wildcat test in DeWitt County, seeking to extend and close in the circle around the Slick-Wilcox pool in Goliad, Karnes, and DeWitt counties. This test will be located 3 miles west of the Slick field on L. Penna land in the Antonio Lazo Survey.

Cecil H. McSpaddin 1 Mary Goggans, new gas-condensate discovery well in Calhoun County, 7 miles southeast of Port Lavaca, has set christmas tree and is waiting on tanks before running potential gage. The well is reported to have flowed gas and condensate through perforations at 5,766-70 ft. with 1,950 psi. tubing pressure on 9/64-in. choke, making about 3,000,000 cu. ft. of gas per day. Total depth is 6,170 ft. with 5½-in. casing set on bottom. This well is located in Benito Morales Survey.

United Producing Co., Inc. 9 Emil Niemann, in the Bonnie View field of Refugio County, has been completed in a new pay zone. The new sand was topped at 5,358 ft., and perforations at 5,399-5,403 ft. Total depth is 6,965 ft., with 5½-in. casing set to 5,480 ft. for the completion. Gage was 127.6 bbl. per day through a ½-in. choke, with gas-oil ratio of 3,140, and tubing pressure 1,550 psi., casing 2,050 psi. The well had tested gas-condensate, and salt water in the section at 6,227-32 ft. and in the new deep 6,200-ft. pay.

In Montgomery County, Humble Oil & Refining Co. and Continental Oil Co. are installing a blow-out preventer in the 1 James C. Baldwin et al, deep wildcat test in the Tamina area. This is being done prior to testing further in perforations made from 14,300-14,295 ft. Gas kicks have been encountered and precautions are being taken to prevent a blowout from the deep hole. Total depth is 14,382 ft., and 7-in. casing is set at 10,998 ft. and 5½-in. casing from 10,910 ft. to 14,382 ft.

Dan Auld et al 1 F. W. Heinrich, wildcat in Goliad County, near the DeWitt County line, and 3½ miles northeast of the Slick field, is reported to have flowed gas and condensate, with no water, on production test from perforations at an undisclosed depth, with 1,300 psi. working pressure. Total depth is 7,774 ft. On drill-stem test made at 7,647-54 ft. in the Luling sand, prior to setting casing, had recovered salt water. This well is located in the Cyrus Donnelly Survey, approximately 3 miles west of the new Brandt field discovery which lies 1½ miles northwest of Weser field.

TEXAS GULF COAST SUCCESSFUL WILDCATS

Bee County: New condensate pool—Rowan & Hope 1 Rio Oil Corp., in J. R. Carney Sur., 2 mi. SW of Yoward field, 4 mi. SW of Mineral, top pay 7,518 ft. (Slick sand), TD 7,868 ft., perf. 7,530-50 ft., IP: 70,000,000 cu. ft. gas per day on open flow, and considerable condensate, SIP 2,680 psi., no water. No gage on condensate.

Refugio County: New oil pay, Bonnie View field—United Prod. Co., Inc. 9 Emil Niemann, Sec. 36, Johnson & Pugh Subd. of Bonnie View Ranch, top pay 5,353 ft., TD 6,965 ft., perf 5,399-5,403 ft., IP: 128 bbl. oil per day through ⅛-in. choke, gas-oil ratio 3,140, TP 1,550 psi., CP 2,050 psi., gravity 30°, no water.

New oil pay, La Rosa field—Stanolind Oil & Gas Co. 37 B. D. Rooke, in J. M. Aldrete Grant, top pay 6,844 ft., TD 9,524 ft., perf. 6,843-48 ft., IP: 187 bbl. oil per day through ⅛-in. choke, gas-oil ratio 1,228, TP 1,290 psi., casing sealed, grav. 44°, no water.

Wharton County: New oil pool, South El Campo area—Floyd L. Karsten 1 Frank Beal, in ETRR Sur., Sec. 51, TD 7,050 ft., top sand 5,561 ft., perf. 5,561-64 ft., IP: 83 bbl. oil per day through 9/64-in. choke, gas-oil ratio 700, TP 725 psi., CP 1,750 psi., 32° gravity, 48 per cent water.

TEXAS GULF COAST WILDCAT FAILURES

Brazoria County: Jack W. Frazier 1 Helene J. Way and C. W. Way, South Manvel area, in Thos. Spraggins Sur., dry, TD 5,050 ft.

Harris County: P. R. Rutherford and Royal Oil & Gas Corp. 1 First National Bank of Houston, in W. P. Mays Sur., 1¼ mi. SW of Dyersdale field, 10 mi. NE of Houston, dry, TD 4,500 ft.

MICHIGAN

Halfway Mark Reached in Michigan's Deepest Test

SAGINAW.—Drillers of what is intended to be Michigan's deepest well this week had reached approximately the halfway mark. A mile of 10-in. pipe has been cemented. The operation, near West Branch, has a goal of 12,000 ft. Started in February it is a cooperative project of Ohio Oil Co. and Pure Oil Co.

Completions in oil and gas fields meanwhile neared a seasonal peak, totaling 27 for 8 oil wells, 7 gas wells, and 12 dry holes, 7 of the latter being wildcats. All but two of the oil wells are in Newaygo County's Kimball Lake field, their initial potentials running estimated rates of flow of from 960 to 2,000 bbl. per day. The other wells are in Allegan and Tuscola counties.

Michigan currently is worried over an impending natural-gas shortage come winter. One phase of the situation is the request of Panhandle Eastern Pipeline Co. for permission to build a 19-mile gas line from Howell field to carry gas to Panhandle's north line at Clawson Junction in Oakland County. The Public Service Commission delayed action, pending a report on success of negotiations for extra natural gas for the state. Consumers Power Co., which serves a large part of Lower Michigan, has intervened in the action and seeks a new contract with Panhandle in the hope of getting more gas to meet the growing demand.

MICHIGAN WILDCAT FAILURES

Allegan County, Fillmore Township: Ford Oil Co. 1 Henry Schrotenboer, SW SW NE 8-4n-15w, dry in Traverse limestone, TD 1,496 ft.

Allegan Township: W. B. Fleming 1 Harold Klein, SW NW SE 16-2n-13w, dry in Traverse limestone, TD 1,488 ft.

Gratiot County, New Haven Township: Muskegon Development Co. 1 Fred Braurer, NE SE SW 24-10n-4w, dry in Dundee, TD 3,255 ft.

Ionia County, North Plains Township: McClure Drilling Co. 1 Leo T. Fox, SE SW SW 23-8n-5w, dry in Dundee, TD 2,976 ft.

Kent County, Byron Township: Rex Oil & Gas Co. 1 W. A. and L. A. Orlik, SE SE NE 32-5n-12w, dry in Traverse limestone, TD 1,761 ft.

Livingston County, Brighton Township: Thomas S. and Ethel M. Leith 1 fee, SE NW NE 32-2n-6e, dry, TD 1,128 ft.

Saginaw County, James Township: Henry L. McEvoy 1 Hayward Brothers, SE SE SW 35-11n-3e, dry in Dundee, TD 3,007 ft.

SOUTH LOUISIANA

New Gas Condensate Pool In Beauregard Parish

NEW ORLEANS.—A new oil pool for Beauregard Parish, 3 miles east of the Perkins field, has been opened by The Union Sulphur Co. 1 W. E. McFatter, 34-7s-10w. Drilled to a total depth of 6,540 ft., this well was completed through perforations at 6,498-6,506 ft. On a 24-hour initial gage the well flowed 129.84 bbl. of 29.5°-gravity oil through a 7/64-in. choke with 1,600 psi. pressure recorded on the tubing, and gas-oil ratio of 1,311. The 7-in. oil string was cemented on bottom.

Stanolind Oil & Gas Co. 1 T. S. Stegall has been completed in a new pay zone for the northwest flank of Welsh Dome, in Jefferson Davis Parish. The well was originally completed through perforations at 6,843-55 ft. On a potential flow the well made 28 bbl. of 44-8°-gravity oil and 2,080,000 cu. ft. of gas per day through a 12/64-in. choke, gas-oil ratio 74,000. The well gradually went to salt water from this pay level and was killed and reworked. Hole was plugged back and perforated at a higher level in the new pay zone. Perforations were made from 6,546-65 ft. and on a flow gage the well made 112.44 bbl. of 38.2°-gravity oil through a ¼-in. choke per day with 500 psi. pressure on the tubing and casing.

The discovery well for the Moss Lake field of Calcasieu Parish, Sun Oil Co. 1 Louisiana Farm & Livestock, has made an official gage. It is located in 7-11s-9w, approximately 2 miles west of East Moss Lake gas production. Total depth is 10,152 ft. and 7-in. casing cemented to 9,196 ft. On official gage the well flowed 136 bbl. of 37.5°-gravity oil through an 8/64-in. choke with 1,850 psi. pressure on tubing. Gas-oil ratio was 3,566, no water.

The California Co. 9 E. P. Brady et al, Unit 1, wildcat test approximately 1½ miles south of the Barataria field in Jefferson Parish, has been completed as an excellent gas discovery. Total depth is 12,307 ft. On an initial gage the open flow was estimated at 240,000,000 cu. ft. of gas per day. Perforations were made at 11,821-866 ft. for the completion.

There were eight new locations reported

FIRST

In the Jones metallurgical laboratory...in the engineering department...and in the field, the endeavor to bring you better sucker rods for every pumping condition goes on. A long list of "Firsts" authentically credited to Jones reflects the success of this program.

The precision built rods in the favorably recognized green color are the best that modern methods, machines, metallurgy and experience can offer. As new advances and improvements are perfected, you can be sure they will be speedily available in the Jones sucker rods you specify and buy.

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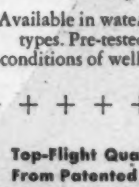

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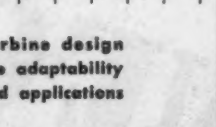

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District Offices: Canton 2, Ohio; Philadelphia: Suburban Square, Ardmore, Pa; Atlanta: Rutland Bldg., Decatur, Ga.; Dallas 1, Tex.; Los Angeles 31, Calif.

this week, including only one wildcat in Cameron Parish. One new oil pool was opened in Calcasieu Parish. Eight of the nine completions were oil wells in proven areas.

SOUTH LOUISIANA SUCCESSFUL WILDCAT

Calcasieu Parish: Oil discovery in Moss Lake: Sun Oil Co. 1 Louisiana Farm & Livestock Co., 7-11s-9w, 2 mi. W of East Moss Lake Gas production, TD 10,152 ft., top sand 8,844 ft., perf. 8,844-48 ft., IP: 136 bbl. oil per day through an 8/64-in. choke, gas-oil ratio 3,566, TP 1,850 psi., gravity 37.5°, no water.

LA.-ARK.

Natchitoches Wildcat Tests Oil and Gas

SHREVEPORT.—In Natchitoches Parish, 7 miles southwest of the townsite, H. C. Cockburn 1 Louisiana Long Leaf Lumber Co., 11-8n-8w, reported some shows of oil and gas. With total depth at 6,705 ft. in the Glen Rose, a drill-stem test at 6,628-34 ft., open 35 minutes, recovered 510 ft. of salt water having a slight show of oil. It was then drilled out to 6,655 ft., when returns were lost and operators ran cement. A second test produced a flow of salt water with a slight show of gas and oil, and operators squeezed open hole at 6,628-55 ft.

In Red River Parish, 4½ miles west of Coushatta, Union Producing Co. 1 Anna Campbell, 20-12n-10w, had total depth at 6,782 ft. in the Travis Peak. First drill-stem test at 6,704-82 ft. failed; a second from 6,746-82 ft., open 10 minutes, produced a slight blow and recovered 25 ft. of gas-cut mud. Top of the Travis Peak was 6,700 ft., by samples.

Shows of gas were reported in Hunt Oil Co. 1 Haynesville Mercantile Co., 11,000-ft. Smackover test 4½ miles west of the Haynesville field, in NE NW 9-23n-9w, Webster Parish. A drill-stem test at 8,427-41 ft., open 9 minutes, produced a slight blow at the surface and recovered 60 ft. of gas-cut mud. On last report it was drilling ahead below 8,719 ft. in hard sandy shale.

Other wildcat reports included Union Producing and Pure 1 L. P. Frazier, 14-14n-6w, Bienville Parish, was drilling below 6,705 ft. in shale and limestone. A test at 6,410-23 ft., open 30 minutes, produced a slight blow and recovered salty mud, with no shows. In Catahoula Parish, Pan American Producing Co. 1 L. R. McGraw, 24-10n-8e, was running casing, with total depth at 6,036 ft. in salt. Hassie Hunt 1 G. W. James, 10-22n-4w, Claiborne Parish, was drilling below 7,561 ft. Skelly Oil Co. 1 Nash, 20-12n-16w, DeSoto Parish, drilling below 9,207 ft.

Northwest of the McKamie field in Lafayette County, Arkansas, McAlester Fuel Co. 1-A McDonald, 23-17s-24w, had total depth at 9,054 ft. in the Smackover. Hard, dense limestone with gas odor was cored at 9,041-46 ft. A drill-stem test from 9,042-51 ft., using 2,000 ft. of water cushion, recovered 180 ft. of gas-cut mud, and 30 ft. of straw-colored distillate. On a test at 9,030-54 ft., packer failed after 6 minutes. In pulling the pipe, 6 stands contained gas-cut mud, and 47 stands had mud with no shows. Testing was to continue.

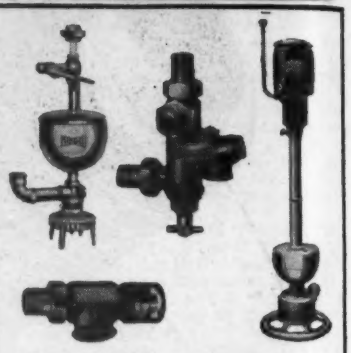
In Calhoun County, Jack Carnes 1 Gauhan, NE SE 34-13s-16w, was drilling below 2,870 ft. Sample tops were: Nacatoch 1,633 ft., Saratoga 1,826 ft., base of the annona 1,920 ft., and the Tokio at 2,136 ft. In Miller County, Big Chief Drilling Co. A. N. Froid, 29-17s-27w, was drilling below 4,815 ft. in the Paluxy.

NORTH LOUISIANA WILDCAT FAILURES

Bossier Parish: M. A. Halsey 1-B Skidmore, SE SE 1-16n-11w, dry, TD 5,837 ft., PB 2,626 ft., show oil 2,613-18 ft.

DeSoto Parish: Ray P. Oden 1 fee, 35-14n-

PENBERTHY
QUALITY PRODUCTS



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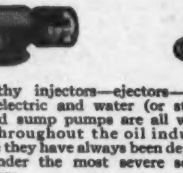

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RECTORSEAL
THE POSITIVE LEAK PREVENTER

14w, dry, TD 3,156 ft., base Austin chalk 2,790 ft., first limestone 2,855 ft., elev. 265 ft.

Madison Parish: V. P. Grage 1 W. R. Gilfoil, 31-18n-13e, dry, TD 4,303 ft., Wilcox 2,160 ft., Midway 3,260 ft., gas rock 3,804 ft., Massive sand 3,868 ft., Paluxy 3,930 ft., elev. 94 ft.

C. H. Murphy & Sun 1 A. L. McKinney, 10-16n-10e, dry, TD 5,004 ft., no shows, no tops reported.

Richland Parish: George B. Franklin 1 fee, 20-18n-8e, dry, TD 3,020 ft., sample tops: chalk 2,860 ft., gas rock 2,705 ft., Hosston 2,711 ft.

ARKANSAS WILDCAT FAILURE

Little River County: Frank & Frankel 1 N. Lock, NE NW NW 19-13s-30w, dry, TD 4,704 ft., Paluxy 1,518 ft., Travis Peak 3,173 ft., Buckner 4,020 ft., elev. 301 ft.

APPALACHIAN FIELD

Pennsylvania Test Shows Gas in Oriskany

PITTSBURGH.—In Summit Township, Erie County, northwest Pennsylvania, Appalachian Development Corp. topped the Oriskany sand at 2,325 ft. in the wildcat on Chester F. Fuhrman farm and at 2,337 ft. there was a showing of gas followed by salt water. The bottom of the sand was placed at 2,340 ft. It may be drilled to the Medina. In Wayne Township, Pennsylvania Gas Co. topped the Onondaga lime at 3,019 ft. in the wildcat on W. W. Stutzman farm from a surface elevation of 1,669 ft. The Tully lime was logged at 2,770-2,845 ft.

In West Bethlehem Township, Washington County, a test completed during the week may be the forerunner of a gas extension as it is loacted east of a depleted pool.

New locations for the week totaled three, in Kiskiminitas Township, Armstrong County; Fallow field and North Strabane townships, Washington County.

In Freemans Creek district, Lewis County, West Virginia, Hope Natural Gas Co., drilling to increase the deliverability of their gas storage pool, shut down 9,110 J. C. Starcher at 2,102 ft., the Big lime, with a showing of 20 bbl. of oil per day which is being tanked. This may start some oil activity in the area.

In the Oriskany extension in Elk district, Kanawha County, a gas well gaging 18,151,000 cu. ft. gas, natural, was completed which had a rock pressure of 1,525 psi. 24 hours. This is the largest rock pressure in recent completions.

New locations totaled 20 for the week, and were in Elk and Union districts, Barbour County; Sheridan district, Calhoun County; Southwest district, Doddridge County; Ripley district, Jackson County; Logan district, Logan County; Harvey & Kermit districts, Mingo County; Portland district, Preston County; Trap Hill district, Raleigh County; Clay, Murphy and Grant districts, Ritchie County; Harper district, Roane County; Buckhannon district, Upshur County; Center district, Wyoming County.

SOUTHWEST PENNSYLVANIA SUCCESSFUL WILDCAT

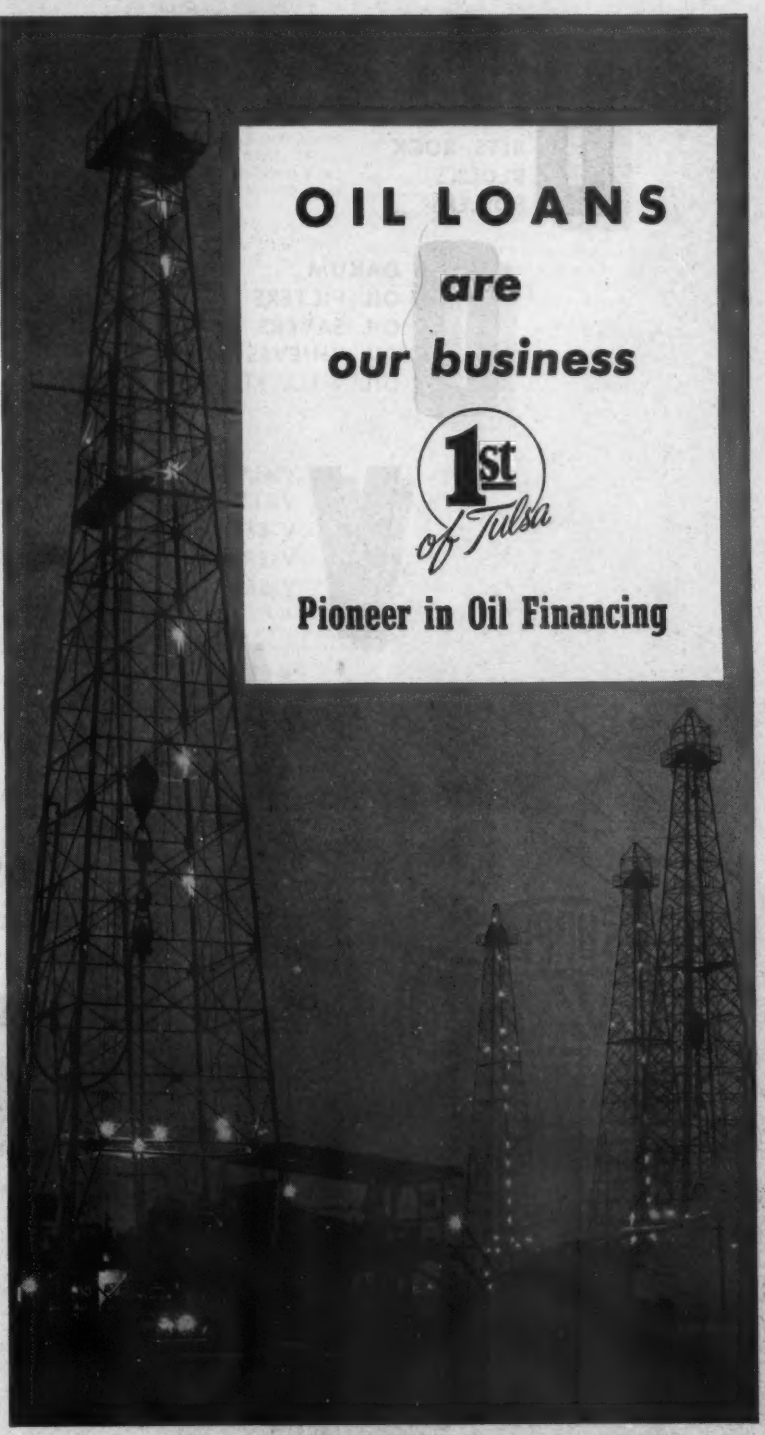
Washington County: West Bethlehem Township: Robert Murray et al 1 James Meeks, 1,382,000 cu. ft. gas from Injun sand, TD 1,692 ft.

WEST VIRGINIA SUCCESSFUL WILDCATS

Braxton County: Otter district—C. F. Engle 1 Herbert Moore, 273,000 cu. ft. gas, Salt sand, TD 1,506 ft.

Kanawha County: Elk district—United Fuel Gas Co. 6,151 Lucinda Carte, 18,151,000 cu. ft. gas, natural, Oriskany sand,

Look Ahead With First National



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N. CENTRAL TEXAS

40-Bbl. Discovery Seeks Mississippi Limestone

WICHITA FALLS.—J. H. Snowden et al 1 Howsley, Block 300, BBB&C Survey, 4½ miles southeast of Trockmorton, made a successful drill-stem test of the Marble Falls section at 4,567-70 ft., total depth. A 70-minute test showed gas at the surface in 2 minutes, oil at the end of 64 minutes, and then flowed into pits for 6 minutes before being shut in. When pipe was broken down, 420 ft. of oil was recovered, with no water. Flowing surface pressure was 500 lb. The flow of oil was estimated at the rate of 40 bbl. an hour. Operators then drilled ahead, seeking the Mississippi limestone. Barnett shale was logged at 4,618 ft.

A third pay for southwestern Young County was indicated at Warren Oil Corp. 1-A Henderson, in the J. C. Cotham Survey. The new zone is the Bend conglomerate topped at 4,196 ft., which showed oil to 4,215 ft. A 1-hour drill-stem test recovered 1½ bbl. of oil. Operators ran electric log and set casing to 4,198 ft. before making production tests.

The Bryant-Edwards (Ellenburger) field of Clay County reported a ¾-mile southeast extension last week at Grace & Grace 1 Edwards. The well flowed at the rate of 240 bbl. in 4 hours through ¾-in. choke, from the Ellenburger at 6,308-40 ft., and was given a daily potential of 1,440 bbl. It is said to be the second largest Ellenburger producer for the county.

In Denton County, 4½ miles south of Sanger, The Texas Co. moved in cable tools to drill the plug at its 1 Saunders. Casing was set at 2,350 ft., with total depth at 2,508 ft. Top on the Ellenburger was 2,311 ft., which was said to have a series of oil shows.

In Wilbarger County, The Texas Co. 1 Schmoker, 1 mile southwest of Odell, was drilling below 5,095 ft. Four miles southeast of Vernon, Fain-McGaha 1 Sharp was drilling below 4,775 ft. in shale.

NORTH CENTRAL TEXAS SUCCESSFUL WILDCAT

Clay County: L. T. Burns 1 W. T. Tally, Blk. 12, J. H. Belcher Subd., 3½ mi. W. Joy, flowed 208 bbl. 43°-gravity oil in 23 hours, ¼-in. choke, gas-oil ratio 550-1, oil sand 4,449-68 ft., TD.

NORTH CENTRAL TEXAS WILDCAT FAILURES

Archer County: Carl Childs 1 L. B. Baker, Lot 22, Blk. 5, Clark & Plumb Subd., 4 mi. SE Archer City, dry, TD 1,174 ft. in shale.

G. E. Kadane 1 Wilson Properties "AA," Blk. 126, ATNC Sur., 2 mi. SE Holliday, dry, TD 1,396 ft. in sand.

Clay County: George Golden 1 G. S. Myers, E. Story Sur., Blk. 48, 6 mi. W Petrolia, dry, TD 1,330 ft.

Cooke County: F & G Co. 1 John Alexander, John Gregg Sur., A-398, 6 mi. SE Valley View, dry, TD 2,117 ft.

Roger Tucker 1 W. L. Dozier, Blk. 43, Fannin School Land Sur., 2 mi. N. Callisburg, dry, TD 6,510 ft., Ellenburger 6,508 ft.

Young County: Benson Bros. 1 B. W. King, Sec. 631, TE&L Sur., 2½ mi. SE Jean, dry, TD 554 ft.

Benson Bros. 1 G. McCluer, Sec. 1,947, TE&L Sur., 2½ mi. SW Loving, dry, TD 551 ft.

K & D Drilling Co. 1 Floyd Woods, Sec. 1,495, TE&L Sur., 4 mi. NE Jean, dry, TD 929 ft.

WEST CENTRAL TEXAS SUCCESSFUL WILDCAT

Jones County: Frank Wood 1-A Hattie Connally, Lot 1, Blk. 4, A. W. Hill Sur., 2¼ mi. SW Lueders, pumped 20.75 bbl. 40°-gravity oil a day, sand 2,029-32 ft., TD 2,039 ft.

WEST CENTRAL TEXAS WILDCAT FAILURES

Callahan County: Loffland & Brinefield 1 H. P. Konnard, Sec. 95, Blk. 13, T&P Sur., 7 mi. N Clyde, dry, TD 2,008 ft., coal 1,809-11 ft., water sand 1,744 ft., show oil 1,905-30 ft. in limestone.

Stephens County: DeKalb Agricultural Ass'n. 1 C. H. Compton, Sec. 2,254, TE&L Co. Sur., dry, TD 4,287 ft., Barnett 4,005 ft., Mississippi 4,198 ft., Ellenburger 4,208 ft.

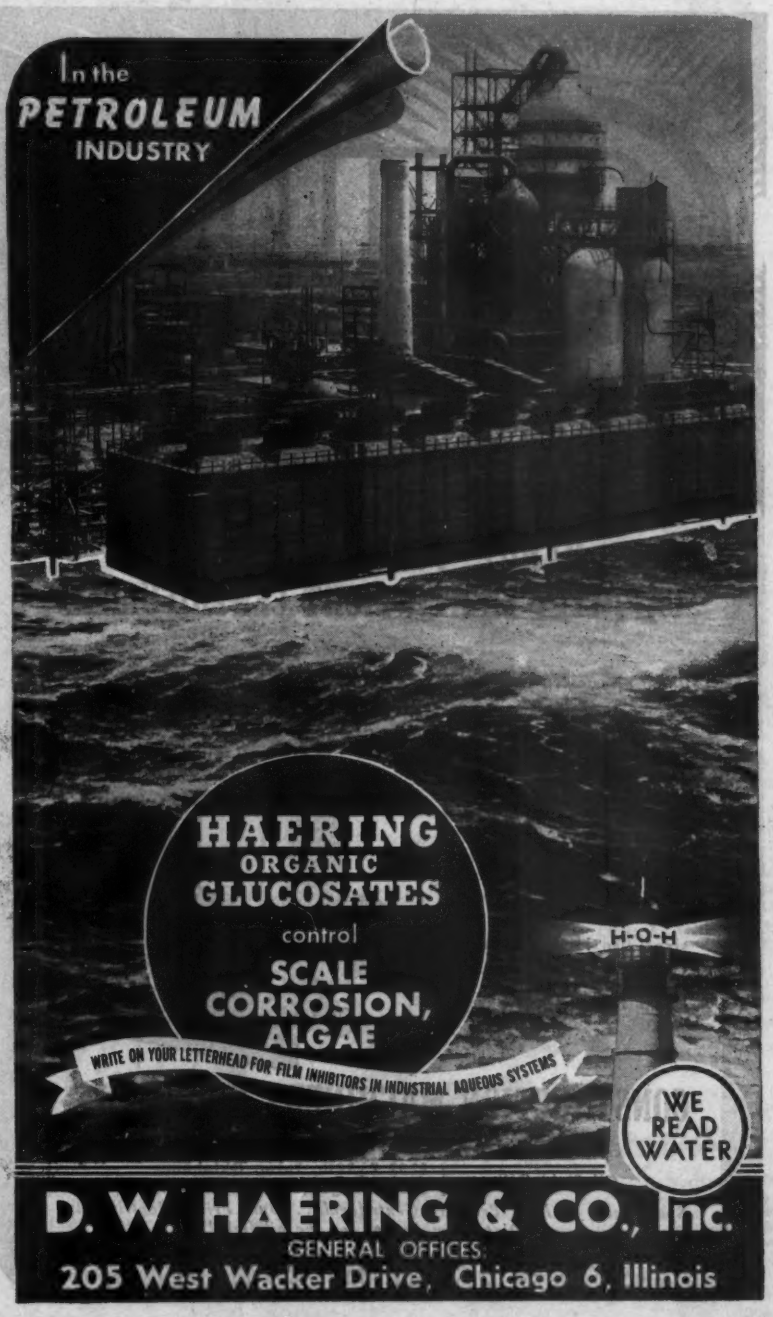
Taylor County: Senate Oil Co. 1 W. A Daniel, Sec. 60, Blk. 19, T&P Sur., dry, TD 4,112 ft., Dotham 2,550 ft., Noodle Creek 2,640 ft., Flippen 2,951 ft., Swastika 3,361 ft.

MISSISSIPPI

Soso Gas Field Gets Extension

JACKSON.—A ½-mile extension to the Soso Gas Field, Jasper and Jones counties, is assured by Union Producing Co. et al 1 Massey Unit, 28-10n-13w. This test recovered good porous gas-condensate sand in basal Eutaw from 6,666 ft. to 6,672 ft., the total depth. The 7-in. casing has been cemented to 6,669 ft.

Amerada Petroleum Co. 1 State of Mississippi, 16-18n-2e, in Warren County, is preparing to take sidewall cores at total depth of 4,322 ft. in Cap Rock. On a core at 3,722-32 ft. recovered 1 ft. of sandstone.



fossiliferous and having bubbles of dark brown oil and gas from a calcite vein. Several cores were made to total depth with no oil shows reported.

Union Sulphur Co. 1 Earline Parker, 31-10n-10w, near Sandersville in Jones County, has moved in pumping equipment to make production test. Casing is perforated between 5,438-50 ft., and swabbing and drill-stem tests recovered about 1 bbl. of fluid an hour. Packer was set at 5,428 ft. Fluid tested 40 per cent heavy oil and balance wash water.

Gulf Refining Co. 1 L. L. Majors, Jones County, is coring below 13,000 ft. Operators have recovered approximately 17 ft. of net saturated oil sand, most of which has been fairly tight, from 12,924-13,025 ft. Soft fine grained ashy sand from 13,023-13,024 ft. had only an odor of gas and oil but with definite brackish taste.

In Amite County, Gulf Refining Co. 2 J. A. Rowland, Trustee, et al "A," 29-4n-2e, is drilling below 10,750 ft., after recovering no shows in cores at 10,610-10,650 ft. Base of Austin chalk 10,440 ft. by Schlumberger.

MISSISSIPPI WILDCAT FAILURES

Sharkey County: C. H. Murphy, Jr.-Sun Oil Co. 1 Barnard Pearl Estate, NE NW 13-13n-6w, dry, TD 4,508 ft., elev. 103 ft. DF.

Simpson County: Hunt Oil Co. 4 Smith County Oil Co., NW SW 15-2n-6e, dry, TD 8,805 ft. Wilcox 2,183 ft., Midway 4,850 ft., Selma 5,545 ft., Tuscaloosa 7,160 ft., Marine Tuscaloosa 7,942 ft., elev. 465 ft. DF.

Yazoo County: Don Reese 1 W. T. Clark, SE NW 8-12n-2w, dry, TD 7,006 ft., Wilcox 1,895 ft., Midway 4,065 ft., Selma 5,023 ft., Tuscaloosa 6,710 ft., 12 sidewall cores in Eutaw and Tuscaloosa recovered no shows.

R. Thomas McDermott 1 Pauline Gaddis, NW NW 32-10n-1w, dry, TD 7,691 ft., Eutaw 6,077 ft., Tuscaloosa 6,814 ft., Massive sand 7,568 ft., Comanche 7,680 ft., 8 sidewall cores in Eutaw and Tuscaloosa recovered no shows.

FLORIDA WILDCAT FAILURE

Franklin County: Magnolia Pet. Co. A-1 Florida State Block 5-B, off-shore, unsurveyed area, dry, TD 7,019. Upper Cretaceous 3,461 ft., Base Chalk 3,542 ft., Tuscaloosa 4,717 ft., Marine Tuscaloosa 5,069 ft., Base Marine Tuscaloosa 5,166 ft.

ALABAMA WILDCAT FAILURES

Marengo County: George Ballio 2 J. L. Bledsole, SW 20-13n-1e, dry, TD 3,548 ft.

Pike County: J. W. Murphy 1 Alex Parks, SW SE 9-9n-23e, dry, TD 2,652 ft., no Schlumberger.

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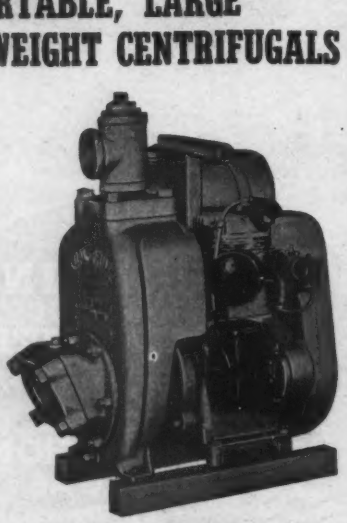

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PERMIAN BASIN

Ellenburger Retest Flows 1,203 Bbl.

MIDLAND.—Gulf Oil Corp.'s Ellenburger discovery in the Goldsmith field of Ector County, the 430-E Goldsmith in Section 15, Block 44, T&P Survey, ran a retest from 9,608-20 ft. and flowed slightly more than 150 bbl. of oil in 3 hours, or at the daily rate of 1,203 bbl. Operators decided on retesting the bottom 12 ft. after water had been recovered on a drill-stem test at 9,570-9,620 ft., along with 40 bbl. of oil. This additional pay section on bottom was said to give the well 125 ft. of pay. Operators planned to set casing on bottom, and then may deepen before making further tests.

Sinclair-Prairie Oil Co. has announced three offset locations to its Crockett County discovery, the 1-66 University, 8½ miles northeast of the Todd Deep field. The offset tests will be in the center of 40-acre tracts to the north, east and west of the discovery. On completion tests, the 1-66 University flowed at the rate of 1,230 bbl. of 49°-gravity oil a day, from the Ellenburger at 7,530-75 ft. Sinclair has asked the Railroad Commission to designate the new field as Midway Lane.

Sun Oil Co. reported a flowing potential of 610 bbl. of 46.9°-gravity oil, with no water, from its 3 Fred Jameson, which became the sixth and largest well in the Jameson field of northwestern Coke County. Location of the well in Section 315, Block 1-A, H&TC Survey, marks a southwest extension to Strawn production. The flow was gaged through ¼-in. choke on tubing set at 6,212 ft., and from perforations at 6,133-75 and 6,220-46 ft. Total depth was 6,565 ft., just above the field's water table.

In southern Andres County, the Martin field was extended ¾ mile northeast at Humble Oil & Refining Co. 8 J. E. Parker, Section 23, Block A-41, PSL Survey. Flowing through ¼-in. choke, it made a daily potential of 996 bbl. of 43.5°-gravity oil, with a gas-oil ratio of 130:1. Total depth was 8,955 ft.

Humble Oil & Refining Co. 1-B J. E. Parker, Section 2, Block 45, T&P Survey, had prospects of extending Clear Fork production 1½ miles southeast in the TXL area of Ector County. A 1-hour drill-stem test, from 5,757-5,960 ft., total depth, produced a gool blow throughout and recovered 180 ft. of oil and gas-cut mud. Operators ran electric survey and were to acidize before testing.

West of the Penwell Ellenburger field, Humble 1 Yarbrough & Allen was preparing to run a second drill-stem test after deepening to 10,271 ft. The first test, open 1 hour, from 10,185-263 ft., recovered 75 ft. of drilling mud, with no show of oil or gas.

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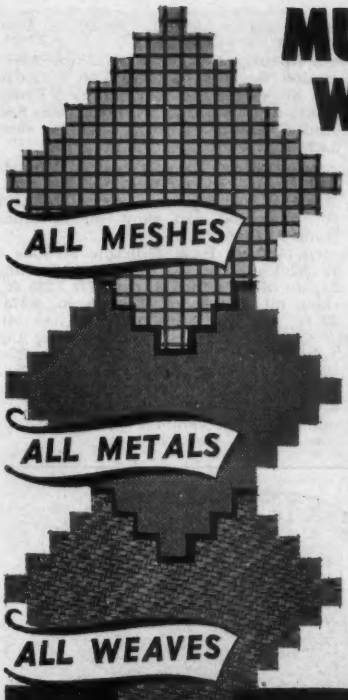

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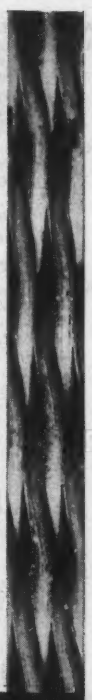

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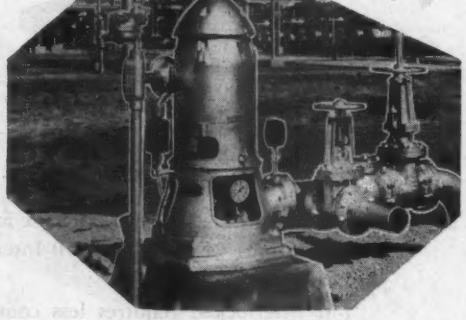

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WEST TEXAS SUCCESSFUL WILDCATS

Andrews County: Cody Oil Co. 1 Lockhart & Brown, Sec. 20, Blk. A-41, PSL Sur., 1 mi. W of W. Fuhrman field, San Andres pay 4,625 ft., pumped 160 bbl. 31°-gravity oil a day through 2-in. set at 4,666 ft., TD 8,706 ft., PB 4,667 ft.

Reeves County, Wolfcamp discovery: Argo Oil Corp. 1 Dora Roberts, Sec. 294, Blk. 13, H&GN Sur., 24 mi. S Pecos, flowed 71 bbl. 43.3°-gravity oil, plus 10 per cent water, gas-oil ratio 650:1, top pay 9,917 ft., TD 14,073 ft., PB 10,853 ft.

WEST TEXAS WILDCAT FAILURES

Borden County: Honolulu Oil Co. 1 J. R. Canning, Sec. 142, Blk. 25, H&TC Sur., 6 mi. NW Sharon Ridge field, dry, TD 4,302 ft., sample tops: Grayburg 1,827 ft., San Andres 2,117 ft.

Concho County: Richards, Patton & Greer 1 Frank Smith, Sec. 609, German Emigration Co. Sur., 5½ mi. SW Paint Rock, dry, TD 4,038 ft., Ellenburger 3,998 ft., with sulfur water, estimated 1,500,000 cu. ft. gas at 3,907-10, 3,920-30 ft., elev. 1,692 ft.

Gaines County: DeKalb Agriculture Association, Inc. 1 E. T. Reves, Lab. 6, Lodge 285, Schleicher CSL Sur., 10 mi. S Cedar Lake, dry, TD 6,513 ft., no shows, San Andres 4,890 ft., porosity 5,020 ft., elev. 3,039 ft.

Glasscock County: Dave Duncan 1 Roberts-Barkhurst, Sec. 7, Blk. 33, T&P Sur., 7 mi. N Garden City, dry, TD 2,684 ft., saturation and show oil in limestone 2,645-46 ft.

Mitchell County: F. A. Gillespie & Sons 1 R. A. May, Sec. 66, Blk. 27, T&P Sur., 2½ mi. SE Westbrook, dry, TD 3,232 ft., show oil 3,018-28 ft., 3,067-75 ft., 3,075-87 ft., and 3,099-3,109 ft., some free oil.

Pecos County: Humble Oil & Refining Co. 1-K Humble-University, Sec. 18, Blk. 16, University Lands, 2½ mi. N Taylor-Link, dry, TD 7,730 ft., San Andres 1,710 ft., Wolfcamp 5,012 ft., base Permian 6,135 ft., Montoya 6,165 ft., Simpson 6,250 ft., elev. 2,405 ft.

TEXAS PANHANDLE WILDCAT FAILURE

Hale County: Southern Minerals Corp. 1 J. W. Heard, Sec. 13, Blk. R, EL&RR Sur., 3 mi. N of Petersburg field, dry, TD 7,210 ft., San Andres 2,700 ft., Tubb 5,080 ft., elev. 3,326 ft.

SOUTHEASTERN NEW MEXICO

HOBBS.—Devonian Oil Co. announced location for a second test in northeastern Lea County, 2½ miles southeast of its recent discovery at 1 Federal-Brown. The new exploration attempt will be the 1 Santa Fe, SE SW 10-9s-37e, and will go to 5,100 ft. The 1 Federal-Brown made a daily potential of 121 bbl. of oil at a depth of 5,011 ft., and has been shut in awaiting pipe line connection. A third location for Devonian, will be the 1-A Santa Fe-Pacific, SE SW 33-10s-36e, which will test the San Andres.

Mid-Continent Petroleum Corp. 2 A. B. Reeves, 29-20s-37e, 5 miles south of the Monument field, Lea County, was drilling below 5,790 ft., on a 6,800-ft. contract. Mid-Continent's 4 Lynch, 1-22s-37e, an 8,000-ft. rotary test in the Brunson field, was below 6,294 ft. in limestone.

In Chaves County, 20 miles east of Lake Arthur, Richfield Oil Corp. 1 Mullis Unit, 21-15s-29e, was preparing to make a drill-stem test on the Ellenburger at 11,900-965 ft.

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CALIFORNIA

Kern County Strike Flows 552 Bbl. Daily

LOS ANGELES.—Pacific Western Oil Corp. has completed its exploratory venture in the McKittrick area of Kern County, the A-84-30 Midway-McKittrick, 30-30s-22e, as an important new discovery in the Point of Rocks formation. On initial tests, the well flowed at the rate of 2,000 bbl. daily for a short period before being choked back to a 600-bbl. daily rate. The crude tested 35.0° gravity and contained a 0.5 per cent water cut. Production was through a 16/64-in. choke. Present production has dropped to 552 bbl. daily of 35.3°-gravity crude and water cut has increased to 0.8 per cent.

Productive intervals at the new discovery are at 4,730-85 ft. and 4,800-45 ft. in the Point of Rocks section. The Oceanic zone was not present at this location. Total depth of the well is 5,196 ft. and 7-in. casing is cemented at 4,959 ft.

Pacific Western has approximately 500 acres of land surrounding the well under lease and a like amount made up of scattered parcels in the immediate area. Location for a follow-up well has already been staked in the same section. It will be known as the 73-30 Midway-McKittrick, and will be the first well of what will probably become a very active drilling campaign in the area.

Also completed during the past week were the Seaboard Oil Co. 1 Johnson, 17-3s-14w, in the Lawndale area of Los Angeles County, and the Basin Oil Co. 1 City of Inglewood, 28-2s-14w, in the Inglewood area of the same county. The 1 Johnson flowed at an estimated rate of 350 bbl. daily through three perforated intervals at 7,900-30 ft., 7,970-80 ft. and 8,000-10 ft. The crude tested 27.0° gravity, and initial flow was accompanied by an estimated 10,000,000 cu. ft. of gas. The well recently has developed a 32 per cent water cut, however, and has been killed preparatory to running tubing with packer to set above the perforations. Producing intervals at the well are in the conglomerate, topped at 7,906 ft., and in the Schist, topped at 7,973 ft.

The 1 City of Inglewood was completed for an initial flow of 240 bbl. per day of 28.9°-gravity crude through a 6/64-in. choke. Water cut was 8.6 per cent. Production at the well is coming from several

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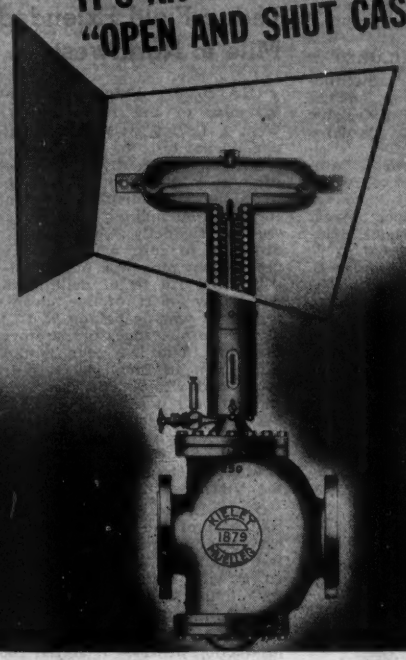

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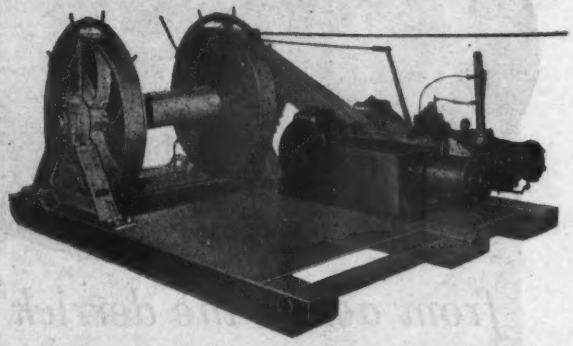

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perforated intervals extending from 9,732 ft. to 10,522 ft. Total depth is 10,590 ft. and 7-in. casing is cemented at 10,563 ft.

Interest in General Exploration Co.'s extension test of the Newhall-Potrero field was aroused again last week with reports that the well had cored an oil zone between 8,450 and 8,600 ft. The reports, unconfirmed, also state that an electric log was run and confirmed the possibilities of a productive horizon. The well, 3 Ferguson, 36-4n-17w, is being drilled ahead below 8,778 ft., however, pending operator's decision on whether to try for a completion here or explore deeper.

Proposed new work continued at a high level in California fields during the past week with locations being staked for 51 new wells. Greatest concentrations of proposed new drilling was in the Kern River and Ventura Avenue fields, each of which received eight of the new locations.

CALIFORNIA SUCCESSFUL WILDCAT

Los Angeles County, Lawndale Area: Seaboard Oil Co. 1 Johnson, 17-3s-14w, flowed 350 bbl. per day through small choke, 27°-gravity, perf. 7,900-30 ft., 7,970-80 ft., 8,000-10 ft., TD 8,026 ft.

CALIFORNIA WILDCAT FAILURES

Kern County, Cymric Area: Rothschild-Bender Oil Operations 3 Sheep Springs, 17-29s-21e, dry, elev. 853 ft., Oceanic 5,121 ft., Brown shale 2,714 ft., Carneros 3,688 ft., TD 5,265 ft.

Temblor Area: Cal Oil & Gas Co. 1 Calumet-Cal, 30-29s-21e, dry, elev. 1,506 ft., TD 2,600 ft.

Santa Barbara County, Lompoc Area: Barnsdall-Honolulu 1 Salsipuedes, 8-6n-33w, dry, elev. 550 ft., TD 1,636 ft.

Goleta Area: Ohio Oil Co. 1 Thomas B. Bishop, 7-4n-28w, dry, elev. 175 ft., TD 3,241 ft.

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CANADIAN FIELDS

Leduc Field Extended Mile to Northwest

CHATHAM.—Extending Leduc field a mile to the northwest, Globe-Leduc West 2, LSD 9, 34-50-25w4, is the first independent test to get production, with crude oil, apparently in commercial quantities, from the D-2 horizon of the Devonian limestone. On a drill-stem test at 4,890-4,940 ft. it started making gas at a rate of 500,000 cu. ft. daily when tester was open, dropping to zero when fluid entered the pipe. When pipe was pulled after an hour, it showed 120 ft. of drilling mud on top and below 540 ft. of live, clean oil. At last reports it was deepening 75 ft. to the base of the porous zone, preparatory to a further test. The D-2 zone is the source of production in Imperials 1 and 5, 2 miles south and west of the new producer, but showed poor porosity in Imperials 4 and 6, 2½ miles due south, and was tight in Imperial 3, over a mile southeast. Globe-Leduc West 1, LSD 6, 19-50-26w4, 3 miles west of production, is deepening after confirming the Viking sand at 3,586 ft.

Okalta-Leduc 1, LSD 13, 7-50-25w4, 2 miles southeast of the proven area, hit water in the upper part of the D-2 zone; drill-stem test at 5,005-37 ft. giving gas flow of 146,000 cu. ft. with a rise of 3,870 ft. of salt water in 1 hour. It is deepening below 5,104 ft. to test the D-3 zone.

Imperial 6, LSD 1, 22-50-26w4, went on production at 5,359 ft., initial reports showing 104 bbl. in unsteady flush flow with 107 bbl. in steady restricted flow in 24 hours. Imperial 7, LSD 4, 15-50-26w4, east offset to the producer lowest on the southwest flank of the field, struck oil and gas in the D-2 zone with some salt water. Coring to the D-3 zone, drill-stem test at 5,379-97 ft. with tester open 25 minutes gave gas flow of 710,000 cu. ft. and some oil, not measured. It has finished at this depth and is being placed on production. Imperial 8, LSD 7, 26-50-26w4, is below 4,908 ft. Imperial 11, LSD 9, 21-50-26w4, and Imperial 12, LSD 12, 22-50-26w4, are drilling, and rig from No. 6 is being skidded for Imperial 13, ¼ mile east.

B. A. Pyrcz 1, LSD 12, 25-50-26w4, is coring below 5,049 ft. in the D-2 zone. Five other tests are drilling, with five locations.

Southeast of the field, McColl-Frontenac East Wetaskiwin, LSD 3, 22-46-23w4, is finishing below 5,368 ft. McColl-Frontenac Bigstone Creek, LSD 1, 20-46-26w4, is below 5,614 ft. and Wizard Lake, LSD 14, 14-48-27w4, is below 5,526 ft.

Jumping Pound.—Shell 5-7-1, LSD 5, 7-25-4w5, is deepening below 11,883 ft., after installing heavy control equipment. Started as a 2-mile southeast extension test to tap the wet gas horizon of the Madison limestone proven 2 years ago by Shell 4-24-J, the well set casing on top of the Madison at 9,800 ft. Gas was struck in the Madison, indicating extensive reserves and it was decided to deepen through the Banff shale into the underlying Devonian limestone. After drilling through the Madison, a fault was encountered, with revised estimate of the top of the Devonian from 12,200 to 12,300 ft. At 11,865 ft., 200 ft. in the Banff, the bit broke into gas at very heavy pressure which after 10 minutes blew out the drilling mud and started blowing wild. Gas flow was estimated 10,000,000 cu. ft. and 2 days constant pumping of mud was required to get the flow under control, a 6-ton control head being installed before the test resumed deepening to the Devonian.

Athabaska.—Near Perryville, in the Athabaska district, Decalta 1, LSD 2, 27-63-23w4, got the Devonian limestone at 2,385 ft., about 300 ft. higher than in the nearby Athadome 2, and is deepening below 2,550 ft. with some indications of porosity. The area is 70 miles north of the Leduc field.

ROCKY MOUNTAIN

New Production Found in Elk Basin

DENVER.—The Elk Basin field on the Wyoming - Montana boundary, which added more than 200,000,000 bbl. of oil to the nation's potential reserves late in 1942 when R. S. Shannon's Minnelusa Oil Corp. brought in the discovery well in the Tensleep horizon, is again in the limelight in a big way. Sinclair-Wyoming Oil Co. 1 Wilkins, NW SW NW 28-9s-23e, Carbon County, Montana, 1¼ miles northwest of the nearest Tensleep producer, swabbed and flowed 540 bbl. in 24 hours from the Madison lime, opening a new pool, and Stanolind Oil & Gas Co. 95 Unit, NE NW SE 31-58n-99w, flowed 20 bbl. of oil into the pits in 7 minutes on a drill-stem test in the Madison. Last-named well is in the southern part of the field proper 2 miles south and ¾ mile east of the Madison discovery completed last fall, and 5 miles southeast of the Wilkins well.

The Wilkins well, which is separated from the field proper by a deep fault, was drilled to 6,795 ft. Top of the Madison was at 6,215 ft. The 7-in. was cemented at 6,373 ft., and 2⅞-in. tubing was run to 6,779 ft. It swabbed 240 bbl. of 32.3°-gravity oil in 9 hours, and then flowed 90 bbl. in 6 hours, and on the last and best gage swabbed and flowed 540 bbl. in 24 hours. It will be acidized. The ground elevation is 4,470 ft. On the way down it had oil and gas in the Frontier, gas in the Dakota, and gas and distillate in the Tensleep.

The Unit well, which indicates that the Madison is productive over a very large area in the field proper, had top of the Madison at 5,029 ft., and is coring ahead at 5,400 ft. A drill-stem test at 5,206-87 ft., open 1 hour, recovered gas odor in 6 minutes, flowed to the surface in 53 minutes, and flowed into the pits the last 7 minutes. The recovery during the last 7 minutes was 20 bbl. of oil. Another drill-stem test at 5,306-61 ft., open 1 hour, recovered a blow of air and a slight gas odor immediately, followed by a recovery of 1,530 ft. of oil and oil-cut mud. The Madison discovery in 38-M Unit, 2 miles to the north of 95-M Unit, is located on the top of the structure, and was completed last fall at 5,013 ft. for 247 bbl. of 30.2°-gravity oil in 24 hours. Top of Madison was at 4,340 ft., elevation 4,503 ft. Several hundred feet of upper Madison was cased off and 865 ft. of 5½-in. liner was set at 4,680 ft.

The new pool opened by Sinclair-Wyoming on the northwest is the second outside the field proper, the other being South Elk Basin, operated by Continental Oil Co. Carter Oil Co. is drilling 8 Johnson-Watson, NE SE SW 8-57n-99w, ¾ mile south of nearest Tensleep producer, on southeast flank, outside the unit, and apparently on the east side of a fault. It is reported unofficially that it will go to the Madison. Texas Co. was high bidder on a state lease on northeast flank, and two wildcats are drilling outposts in the South Elk Basin field.

East Antelope blowout.—Continental Oil Co.-General Petroleum 1 Unit, NW SW SE, 26-27n-93w, East Antelope, Fremont County, Wyoming, has overcome gas blowout at 1,360-66 ft. in Tertiary sand, and is drilling ahead at 2,870 ft. Gas was estimated at 15,000,000 to 20,000,000 cu. ft. per day, had good methane content and was inflammable.

Boulder Knoll test.—1 Redd, C SE NE 23-34s-25e, an 8,000-ft. test on Boulder Knoll, San Juan County, Utah, is drilling below 1,600 ft. after cementing the 13⅜-in. at 309 ft. This well is carried by the scouts as a Southern Union Production Co. operation. It is being drilled for Western Natural Gas Co., Byrd-Frost, Inc., and Paul B. English, and Southern Union is only the contractor.

Church Buttes.—Mountain Fuel Supply Co. 3 Unit, SW NE 12-16n-113w, Church Buttes, Uinta County, Wyoming, 1½ miles west of the discovery, is testing for final completion at 13,060 ft. No. 2 Unit, NE NE 22-17n-112w, Sweetwater County, 4¾ miles northeast, is bottomed at 12,692 ft., and is repairing casing trouble at 4,139 ft.

SUCCESSFUL WILDCAT COMPLETION IN COLORADO

Powder Wash, Moffat County: Sprecher Drilling Co. 1 Government, SW SW NW 34-12n-97w, TD 5,225 ft., PB to 4,634 ft., and completed in lower Wasatch through perf. at 4,598-4,626 and 4,578-80 ft. for 62 bbl. oil and 40 bbl. water in 12 hours, pumping. Extension ¾ mile east.

WILDCAT FAILURES IN COLORADO

Rattlesnake Butte, Huerfano County: Skelly Oil Co. 1 Shafer, NE NW SE 32-26s-64w, TD 851 ft., P. & A. Strat. test.

Red Mesa, La Plata County: Ashback & Locke 1 Krueger, CEL SW NE 34-33n-12w, TD 3,482 ft., 40 ft. salt water in top Dakota, P. & A.

Yellowjacket, Rio Blanco County: Phillips Petroleum Co. 1 Unit, NW SE SW 1-1n-92w, TD 5,082 ft., P. & A. Madison, 4,565, Devonian 4,700, Ordovician 4,880, Cambrian 5,082 ft., elev. 9,213 ground.

SUCCESSFUL WILDCAT COMPLETION IN MONTANA

Six Shooter, Sweetgrass County: R. C. Tarrant 1 Opland, C SE SE 10-3n-18e, TD 632 ft., top of Eagle, 630, PB to 550 ft. and completed in Claggett for 250,000 cu. ft. of gas.

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ILLINOIS

Benoist Sand Prospect May Open New Area

MATTOON.—Calvert and Willis et al 1 Garwood, NW NW SW 16-1s-13w, Wabash County, recovered gas, 170 ft. clean oil, 30 ft. oil-cut mud and no water on drill-stem test at 2,584-2,603 ft., in Benoist sand. Pipe is set at 2,581 ft. Total depth is 2,603 ft. Glean Dean was topped at 2,197 ft., Golconda at 2,343 ft., Lower Paint Creek at 2,581 ft., and Benoist at 2,585 ft.

On the east side of the Noble pool, Richland County, Central Pipe Line Co. et al 2 Harrel-Huntley Community, S½ NE SW 35-4n-9e, made 135 bbl. oil per hour, flowing, from Rosiclare pay at 2,930-42 ft. The well was treated with 5,000 gal. of acid. This is the best completion in the area to date.

Ben Taylor 1 Wilson, NE SE SW 30-6s-6e, Hamilton County, a wildcat test originally reported as dry, has been successfully reworked. The well was cleaned out to total depth and drilled 1 ft. deeper to 3,302 ft. Aux Vases was shot with 20 qt. at 3,180-89 ft. Well pumped 12 bbl. in 7 hours and was assigned initial rating of 52 bbl.

ILLINOIS SUCCESSFUL WILDCATS

Gallatin County: Sohio Petroleum Co. 1 Lynch, NE NE NE 32-8s-10e, completed in Renault 2,742-50 ft. and Aux Vases 2,772-80 ft., IP 149 bbl., pumping, 3,000 gal. acid. TD 2,790 ft.

Hamilton County: Ben Taylor 1 Wilson, NE SE SW 30-6s-6e, re-worked well, originally reported dry, OTD 3,301 ft., cleaned out to 3,302 ft., shot 20 qt., IP 52 bbl. Aux Vases.

Wabash County: Hayes et al 1A Loren Peter, NW NW NW 20-1s-13w, IP 75 bbl., Renault pay 2,856-64 ft., TD 2,939 ft., Glen Dean 2,314 ft., Rosiclare 2,856 ft.

Wayne County: A. J. Slagter 1 Haynes, SE NE SW 4-1s-7e, IP 42 bbl., Aux Vases 3,105-37 ft., shot 165 qt. 3,105-37 ft. Renault 3,086 ft., Aux Vases 3,105 ft., TD 3,172 ft.

ILLINOIS WILDCAT FAILURES

Coles County: Sanders 1B Childers, NW SW SW 30-13n-11e, dry at 2,325 ft., Chattanooga 997 ft., Devonian 1,090 ft., Maquoketa 2,026 ft., Trenton 2,134 ft.

Clay County: C. E. Brehm 1 Bailey, SE NE NE 14-4n-5e, dry at 2,744 ft., Glen Dean 2,119 ft., Cypress 2,324 ft., Benoist 2,465 ft., Aux Vases 2,551 ft., Ste. Genevieve 2,601 ft.

Gallatin County: Pure Oil Co. 1 Logsdon, NW SW SW 22-9s-10e, dry at 2,800 ft., Barlow 2,298 ft., Ste. Genevieve 2,673 ft., Fredonia 2,718 ft.

Wabash County: Lyle Dieterla 1 Stillwell, NW SW SW 8-1n-11w, dry at 1,620 ft.

KANSAS

Western Kansas Has Interesting Oil Prospect

STANOLIND OIL & GAS CO. 1 Wheatley, NE NE SW 23-33s-31w, Seward County, showed gas in seven minutes and recovered 2,690 ft. of 41°-gravity oil, 37 ft. oil-cut mud and 810 ft. water on one-hour drill-stem test at 5,099-5,117 ft. A second test at 5,165-83 ft. had gas in 18 minutes estimated at 175,000 cu. ft. per day, and recovered 125 ft. oil and gas-cut mud. Kansas City was logged at 4,314 ft. The test is 15 miles east of the Hugoton gas field and is about the same distance northeast of the Stanolind 1 Feathers, 15-35s-33w, a gas-distillate well in the Pennsylvanian.

Skelly Oil Co. 1 Rempe, NW NW NE 28-9s-18w, Rooks County, has a pump potential of 259 bbl. from Arbuckle. This well marks the present southern limit of the Paradise Creek pool and is about ¾ mile northwest of the Dozier et al. 1 Hayes, NE NE SE 28-9s-18w, which opened the South Paradise Creek pool in Lansing formation.

KANSAS SUCCESSFUL WILDCATS

Barton County: Bridgeport 1 Hunt, NE NE NE 32-17s-14w, pumped 180 bbl. of oil per day from Lansing-Kansas City at 3,196-3,200 ft.; conglomerate 3,411 ft., Arbuckle 3,462 ft., TD 3,473 ft.

Cowley County: Mid-Plains & Veeder 1 Reidy, NE NW NW 15-32s-7e, pumped 25 bbl. of oil per day from Bartlesville at 2,817-31 ft., Layton 2,092 ft., Kansas City 2,221 ft., Basal Kansas City 2,366 ft., Cherokee 2,634 ft., Mississippian 2,916 ft., TD 2,965 ft.

KANSAS WILDCAT FAILURES

Barber County: Bishop Oil 1 Burns, NE NE NE 25-33s-11w, dry, TD 5,242 ft., Elgin 3,484 ft., Lansing 3,921 ft., Kansas City 4,197 ft., Mississippi lime 4,618 ft. with a show of oil, Viola 4,956 ft., Arbuckle 5,214 ft.

Barton County: Phil-Han 1 Reidel, SE SE SW 10-17s-14w, dry, TD 3,495 ft., anhydrite 945 ft., Heebner 3,123 ft., Lansing-Kansas City 3,187 ft., conglomerate 3,421 ft., Arbuckle 3,475 ft.

Greenwood County: Union Oil of California 1 Boone, NW NW SE 15-25s-10e, dry, TD 2,140 ft., Lansing 1,010-1,156 ft., Kansas City 1,294-1,475 ft., Oswego 1,342 ft., Bartlesville 1,874 ft., Mississippi lime 2,100 ft.

Ness County: Jones & Shelburne & Farmer & Deep Rock 1 Miner, SW SW SE 22-16s-24w, dry, TD 4,610 ft., Lansing-Kansas City 3,890 ft., sand 4,512-18 ft. with slight show of oil, Mississippian 4,541 ft.

Phillips County: Barnett Drilling & Wilcox Oil 1 Penkerton, NE SE NE 15-5s-19w, dry, TD 3,593 ft., anhydrite 1,630 ft., Topeka 3,041 ft., Heebner 3,242 ft., Lansing-Kansas City 3,283 ft., Arbuckle 3,567 ft.

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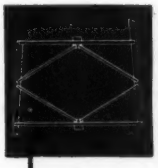

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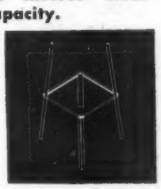

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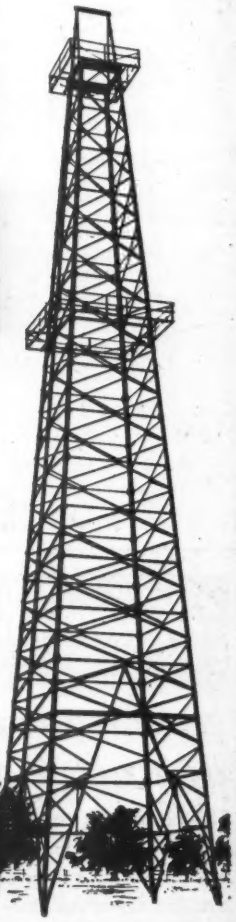

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Rooks County: John Lindas 1 Skenyon, C W/2 NE NE 11-8s-19w, dry, TD 3,420 ft., anhydrite 1,318 ft., Topeka 2,722 ft., Lansing-Kansas City 3,049 ft., Basal Kansas City 3,292 ft., cherty conglomerate 3,348 ft., sandy conglomerate 3,379 ft., Arbuckle 3,389 ft.

Russell County: Dutton & E. F. Hicks 1 Steinle, SE SE SE 4-11s-12w, dry, TD 3,142 ft., anhydrite 706-39 ft., Dodge 2,680 ft., Topeka 2,540 ft., Lansing 2,938 ft., Kansas City 3,073 ft.

OHIO, KENTUCKY

Three Extensions Pace Successful Week

COLUMBUS.—The spotty but rich Sego pool in Madison Township, Perry County, is extended 1,000 ft. south by the John Morrow et al 2 C. A. Crossan, Section 27, which was drilled in with an excellent showing of oil. The Clinton sand, topped at 3,338 ft., filled up 2,800 ft. with oil while drilling in the sand for 12 hours.

A mile and one-half to the south and in the Clayton pool, the Preston Oil 2 J. E. Embrey, Section 4, Clayton Township, came in as a good producer. Clinton sand at 3,306-60 ft. was shot with 120 qt. and made 80 bbl. in 24 hours.

The Ohio Fuel 1 M. L. Deaver, Section 28, Pleasant Township, Perry County, extended the Sayre pool ¼ mile west with a Medina sand well. Clinton sand at 3,725-72 ft. was dry and the Medina sand, topped at 3,838 ft. made 1,180,000 cu. ft. of gas at 6 ft. in, where drilling was stopped.

The third gas well in the new pool in eastern Monroe Township, Knox County, was drilled in and tubed natural by H. E. Perkins on the Aurilla Wagner tract, Lot 7. Clinton sand at 2,455-78 ft. gaged 465,000 cu. ft. and rocked up to 850 lb.

OHIO WILDCAT FAILURE

Medina County, Spencer Township: Ohio Fuel Gas 1 L. W. Reisinger, Sec. 23, dry, no Clinton, TD 2,673 ft.

WESTERN KENTUCKY

OWENSBORO.—Felmont Corp. 1 Dave Rolland, 4-N-32, Daviess County, a wildcat test about 1½ miles southwest of Whitesville, is drilling below 380 ft. In Madison County, Waller and Chenault are drilling below 1,921 ft. in 1 George Ginter, 12-P-65. C. E. O'Neal et al is drilling below 2,199 ft. in 1 Culver, 9-P-20, Union County, a wildcat test located 4 miles northeast of Uniontown.

INDIANA

EVANSVILLE.—Ashland Oil & Refining Co. 1 Bender, SW NW NE 36-3s-12w, Gibson County, swabbed 117 bbl. oil in 13 hours from the McClosky pay at 2,539-43 ft. after acid treatment of 3,000 gal. Total depth is 2,551 ft. Well is being put on pump to test.

Magnolia Petroleum Co. 6 Armbruster, NW NW SW 13-7s-14w, Posey County, which was originally completed as a producer in Waltersburg sand has been reworked and is now producing from perforations in both the Palestine and Waltersburg sands. Palestine was perforated at 1,749-60 ft. and Waltersburg at 1,940-50 ft. Initial production is 44 bbl. The Palestine is a new producing horizon for the Jeffries pool.

INDIANA SUCCESSFUL WILDCATS

Knox County: Steve Zanetis 1 Gilliot, sur. 10-3n-10w, IP 5 bbl., Rosiclare pay 1,871-91 ft., TD 1,891 ft.

Posey County: Magnolia Petroleum Co. 6 Armbruster, NW NW SW 13-7s-14w, reworked well, new pay Palestine sand in Jefferies pool, perf. 1,749-60 in Palestine, and 1,940-50 in Waltersburg, IP 44 bbl. OTD. 2,834 ft., PB 1,954 ft.

INDIANA WILDCAT FAILURES

Gibson County: Joe Reznik 1 Hall, SE SW NW 31-2s-12w, dry at 2,720 ft., tested McClosky.

Knox County: Cummings Oil Co. 1 Gilliot, sur. 9-3n-10w, dry at 1,905 ft., drilled through McClosky.

Posey County: Calvert-Willis Inc. 1 Bailey, SW SW SW 4-5s-13w, dry at 3,043 ft., Lower Kincaid 1,865 ft., Glen Dean 2,343 ft., Ste. Genevieve 2,941 ft., McClosky 3,032 ft.

Texas Co. 1 Stevens-Knight, SE SW SW 15-6s-13w, dry at 2,980 ft., Menard 1,960 ft., Cypress 2,490 ft., Ste. Genevieve 2,771 ft., McClosky 2,907 ft.

John Buckman 1 Pfeiffer, SE NW NW 13-6s-13w, dry at 410 ft.

OKLAHOMA

East Lindsay Extension Has 422 Ft. of Tested Pay

SINCLAIR PRAIRIE 1 McDaniel, SE SE 35-5n-4w, McClain County, which to the end of last week had drilled 347 ft. of Simpson in which seven drill-stem tests at different intervals starting at 10,100 ft., have shown good oil production, has proven an additional 75 ft. of pay making 422 ft. of tested pay section. The eighth drill-stem test, made at 10,437-84 ft., recovered water load in 6 minutes, gas flow estimated at 3,100,000 cu. ft. in 9 minutes, and oil in 15 minutes. The well then flowed 38 bbl. 45.6°-gravity oil the first hour and 40 bbl. the second hour with ½-in. bottom choke and ¾-in. top choke. The ninth drill-stem test made at 10,484-10,523 ft. recovered water load in 8 minutes, gas in 10 minutes which gaged 7,100,000 cu. ft. per day, and oil in 15 minutes. Well flowed 59 bbl. 50°-gravity oil the first hour and 53 bbl. the second. This well definitely extends the East Lindsay pool about ¾ of a mile to the northwest.

Carter 1 Randolph, SE NW 5-1n-1w, has been completed in Third Deese from pay zones at 6,123-30 ft., and 6,136-43 ft. Total depth is 6,219 ft. Well flowed 80 bbl. 46.6°-gravity oil in 24 hours with no water. This is a southeast diagonal offset on 40-acre spacing to the discovery well of the Katie pool, which produces from Hoxbar at 6,070-94 ft.

Sinclair Prairie 1 Woods, NW SW NW 15-5n-2w, McClain County, had top of Hunton at 7,083 ft. Total depth is 7,156 ft. Pipe is being set after running electric log. This well is a south offset to the Deering Inc. 1 Howard, NW NW 15-5n-2w, which flowed 25 bbl. oil per hour from Deese at 7,045-78 ft. These two wells are outposts of the Southwest Wayne pool and commercial production would give that area an important extension of about 2 miles to the northwest of the Southwest Wayne pool.

OKLAHOMA SUCCESSFUL WILDCATS

Cotton County: Amerada 1 Per-Man-Su, SE SW NE 35-3s-11w, pumped 12 bbl. of 35°-gravity oil per day from sand at 1,402-13 ft.; sand 1,180-1,260 ft., TD 1,413 ft.

C. P. Burton 1 Waon-Er-Ver-Tah, NE NW SE 35-3s-11w, pumped 20 bbl. of 35°-gravity oil per day from sand at 1,396-1,401 ft., TD 1,401 ft.

Garvin County: Magnolia 1 Lacy, C SE NW 5-4n-3w, flowed 88 bbl. of 43°-gravity oil per day from 9,608-35 ft., through a 24/64-in. tubing choke, Tonkawa 5,730 ft., Caney 7,505 ft., Mayes 7,645 ft., Woodford 7,840 ft., Hunton 8,700 ft., Viola 8,770 ft., Sylvan 8,590 ft., Bromide 9,388 ft.

Jackson County: Extension to E. Altus—H. C. Taylor 1 Buser, SW SW NW 9-1n-19w, IP 6 bbl. of 36°-gravity oil per day from 1,369-73 ft., TD 1,461 ft. in brown shale.

OKLAHOMA WILDCAT FAILURES

Cimarron County: The Texas Co. 1 G. E. Hall, C NE SW 29-2n-3ecm, dry, TD 2,321 ft., Alibates 1,060 ft., white lime 4,027 ft., Granite wash 4,418 ft., Mississippin 5,902 ft.

Cotton County: E. R. Graham et al 1 Bone, C SE SW SE 7-4s-10w, dry, TD 1,405 ft., conglomerate 1,132-48 ft., no shows.

Bridwell Oil Co. 1 Cox, SW SE NW 23-3s-10w, dry, TD 1,550 ft., no shows, no tops reported.

Norman-Graham 1 He-Vah, NE NE NW 10-4s-11w, dry, TD 2,014 ft., sand 1,000-24 ft., 1,254-72 ft., 1,342-65 ft., 1,399-1,422 ft., 1,466-1,508 ft., 1,524-28 ft., 1,534-52 ft., 1,620-54 ft., and 1,851-75 ft.

Albritton & Bilbrey 1 Handy, NE NE NE 28-2s-12w, dry, TD 2,010 ft., lime

(Continued on page 165)

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Active rotary drilling rigs in the United States hit an all-time high of 1,909 in July . . . see story on page 57.

Drilling Applications Up 25 Per Cent in Texas

Applications for drilling permits in Texas are running 25 per cent higher thus far this year as compared with 1946, according to the Texas Railroad Commission. To date, 5,382 applications have been received contrasting with 4,303 during the same period last year.

A.A.O.D.C. Urges Early Long Beach Reservations

The American Association of Oilwell Driling Contractors is urging all those planning to attend the association's annual meeting at Long Beach, Calif., October 13-15, to send in their requests for hotel reservations immediately. Requests should be sent direct to D. H. Graham, Dunlap & Graham, 2450 Cerritos Avenue, Long Beach, chairman of the housing committee. Arrival time and type of reservation wanted should be stated on the request.

The entertainment committee is preparing a full program of activities for ladies attending the convention, as well as men. A trip to the movie studios and "brunch" and a fashion show at a local country club are among the attractions. For the men, a barbecue, manufacturing-plant tours, and a Long Beach Harbor inspection trip as guests of the harbor department have been arranged.

J. H. Forrester, tool pusher, Trinity Drilling Co., and F. Z. Kellerman, superintendent, Continental Oil Co., on Continental's 41-1 Kloah, Ector County, Texas

Drilling-Mud Classes Announced For Texas

Dates have been announced for August and September drilling-mud classes in Texas which are sponsored by the American Association of Oilwell Drilling Contractors, Texas State Board of Vocational Education, and University of Texas. John Woodruff, state coordinator of petroleum industry training announces the following:

August 11-22, Midland
August 25-September 5, Levelland
September 15-26, Pampa (tentative date)
September 29, Sweeny (Old Ocean)

Also, a committee has been formed at Brookhaven, Miss., to make arrangements for a school there. Members of the committee are: C. A. Pickens, Danciger Oil & Refining Co.; J. W. Thomas, Penrod Drilling Co.; J. A. Roberson, Loffland Brothers; and Dorris Ballew, Helmerich & Payne.

J. I. Roberts Drilling Co., Shreveport, is the contractor for Charles H. Murphy, Jr., 1 Tensas Delta Hardwood, a wildcat, C SE NE 36-6n-4e, Elm Ridge field, LaSalle Parish, North Louisiana.

Brown Drilling Co., Long Beach, will drill Honolulu Oil Corp. 1 Lamb, West Newport area, Orange County, California.

Kendrick Newcomb is the contractor for a 2,000-ft. cable-tool test for **Gar-Ter Drilling Co.**, the 1 Weiner-Isabel Vaughn, NW SW SE, Section 86, Block OP, GC&SF Survey, Crockett County, West Texas.

Jack Wilder, Wichita Falls, is drilling a 2,500-ft. test for W. C. Estes and W. H. Sprodling, the 1 Masters, SW SE NW 11-2n-21w, northwest of Altus.

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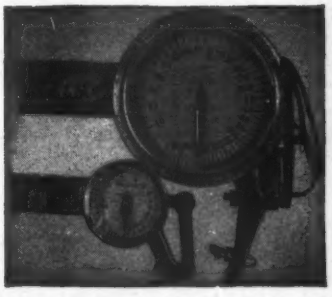

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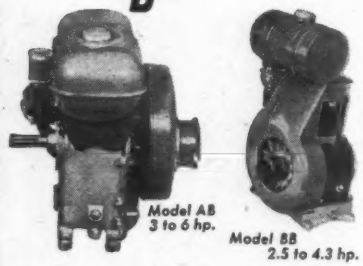

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Jackson County, Oklahoma. The wildcat will test the Pennsylvanian and is on a block assembled by J. P. Morgan, Altus.

Roy L. Fisher, Jackson, Miss., will drill a 9,500-ft. wildcat for General American Oil Co., the 1 Sam Calvert et al, C NE NW SE 35-7n-6e, northeast of Willow Lake field, Catahoula Parish, North Louisiana. The test is seeking the Tuscaloosa.

Robert Maddox has contract for four gas wells to be drilled on 30,000 acres in San Juan basin of Colorado, Utah, and New Mexico, for Paul B. English, Western Natural Gas Co., and Byrd Frost, Inc. The wells will be in Fulcher basin between Farmington and Axtec which is a continuation of the trend to the Barker dome from Kutz canyon where Southern Union Gas Co. has a number of wells.

William P. Sullivan, Wichita, Kans., is moving a drilling outfit to Alberta, Canada, and will enter that field as a drilling contractor.

Turner Drilling Corp., Mount Pleasant, Mich., will drill the Cities Service Oil Co. 1 State-Leavitt, a wildcat, SE SE SW 17-15n-15w, Oceana County, Michigan.

Ray & Woolf, Shreveport, have the contract for a 6,300-ft. test for North American Oil Co., the 1 Fly, 20-19n-16w, Longwood field, Caddo Parish, North Louisiana.

R-G Drilling Co., Wichita Falls, has completed its 1 W. C. Whitaker, Section 963, TE&L Survey, Throckmorton County, North Texas, for 93.5 bbl. of oil in 3 hours through 12/64-in. choke.

Webster Drilling Co. has the contract for **Indian Mud Drilling Co.** 1 High Eagle, NW SW NE 5-20-53, Lone Chimney area, Pawnee County, Oklahoma, which is testing after drilling to 3,954 ft.

Sante Fe Drilling Co., Sante Fe Springs, has completed Union Oil Co. 109 Callender, Dominquez field, Los Angeles County, California, for 1,122 bbl. per day through 1-in. choke. Santa Fe has also received contract to drill a wildcat, Barnsdall Oil Co. and Honolulu Oil Corp. 1 Salsipuedes, Lompoc area, Santa Barbara County, California.

Santa Maria Drilling Co., Long Beach, is the contractor for Union Oil Co. 10 Simi, on Simi Ranch, Los Angeles County, California.

Spencer - Durham Drilling Co. is drilling 1 M. M. Fisher, 660 ft. from south and west lines, Section 9, Block A-36, PSL Survey, on the northwest side of Shafter Lake field, north cen-

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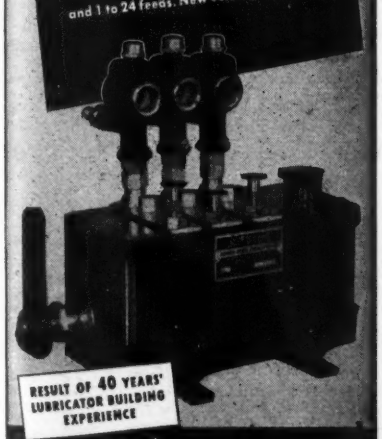


RESULT OF 40 YEARS' LUBRICATOR BUILDING EXPERIENCE

McCORD CORPORATION
DETROIT 11, MICHIGAN
LUBRICATOR DIVISION

tral Andrews County, Texas. The well is planned for 4,500 ft.

Mallard Drilling Co., Wichita, has brought in a producer for a pump potential of 165 bbl. daily in Rice County, Kansas. The well is 3 Anderson, SW SE SW 25-19-6, with a total depth of 3,366 ft.

Portable Drilling Corp., Tulsa, has staked location for a 2,650-ft. test, its 1 Janie Church, SE NE SW 2-5n-7e, Seminole County, Oklahoma.

Meredith, Clegg & Hunt, Houston, having completed 2 Walker for Sohio Petroleum Co. in Holmwood field, Calcasieu Parish, Louisiana, as a producer, have moved over and set surface pipe on 3 Walker at 1,845 ft. Contract depth is 10,400 ft.

McCall-Cline, Mount Carmel, Ill., has contract for Peter Gerasimos 1 Robert L. Kelley, 1,909 ft. from south and 626 ft. from west lines, NE SE NE 36-4n-12w, Lawrence County, Illinois.

C. E. O'Neal, Evansville, is using his own tools to drill Buckman-C. E. O'Neal 1 Wendell Wassmer, NE SW W½ SW 6-5s-11w, Vanderburgh County, Indiana.

Summitt Drilling Co., Tulsa, is below surface pipe at its 1 Gillaspy, NE NE SE 29-21s-1w, a Wilcox sand test ½ mile west of the Perry gas field, Noble County, Oklahoma. Summitt has a 1,400-acre block.

Hall-Miller Drilling Co., Oklahoma City, is planning a wildcat in Oklahoma County, Oklahoma, its 1 Max Geisler, NE NE SE 26-13n-1e.

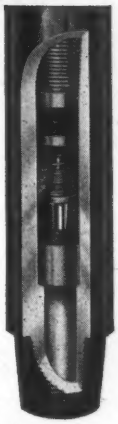
Shaw Petroleums, Lloydminster, Sask., has completed Athlone 3, NE LSD 5, 11-50-2w4, in the Lloydminster-Lone Rock area, Alberta. The well had a total depth of 2,003 ft. and struck the Sparky oil zone at 1,998 ft.

Delta Drilling Co., Evansville, is rigging up rotary for Indiana Farm Bureau 1 M. F. Szramkowski, SE SW SE 33-2s-1e, Jefferson County, Illinois.

W. L. Clingman Drilling Co., Inc., Guthrie, Okla., has been issued a charter by the Oklahoma secretary of state. The firm is capitalized at $40,000 and was incorporated by Walter L. Clingman and Ernest H. Clingman, of Oklahoma City, and Fred A. Holman, Guthrie.

Crow Drilling Co., Shreveport, will drill Sohio Oil Co.'s Woodbine wildcat in Anderson County, East Texas, about 3½ miles northeast of Continental Oil Co. 1 Royall. It will be the 1 Southern Pine, in the J. Gibson Survey. Contract depth is 6,000 ft.

I'm a popular guy with fast-moving, safety-minded crews because I . . .



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Relieve Weight on Derrick
•
Lengthen Life of Lines and Brake Bands

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STATISTICS and T

WEEKLY WELL COMPLETIONS . . . WEEK ENDED AUGUST 9, 1947

	Total of all wells					Cum.		Wildcat completions and discoveries					Cumulative total, 1947				
	Comp.	Oil	Gas	Dry	Footage	1947	1946	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	37	18	0	*19	48,743	920	955	0	0	0	0	0	3	0	0	2	5
Pennsylvania	64	35	3	†26	97,279	1,726	2,411	0	0	1	0	1	0	0	2	1	3
West Virginia	19	2	16	1	61,905	495	429	0	0	2	0	2	0	0	9	4	13
Ohio	30	6	13	‡11	88,760	761	722	0	0	0	1	1	0	0	3	30	33
Indiana	23	10	0	13	41,590	382	216	2	0	0	5	7	15	0	0	30	45
Kentucky	19	7	4	8	31,480	383	297	0	0	0	0	0	6	0	0	28	34
Illinois	43	19	0	24	105,044	1,194	1,324	4	0	0	4	8	44	0	1	208	253
Michigan	27	8	7	12	53,377	492	481	0	0	0	7	7	5	0	9	126	140
Kansas	71	37	6	‡28	228,221	1,532	1,188	2	0	0	7	9	26	0	11	199	236
Neb., Mo., Iowa	0	0	0	0	0	3	12	0	0	0	0	0	0	0	0	3	3
Oklahoma	119	65	9	45	350,980	2,462	1,568	4	0	0	20	24	59	3	9	418	489
Texas	203	119	6	78	840,918	5,370	4,847	9	1	1	29	40	176	32	56	801	1,065
N. Central (Dist. 7-B & 9)	70	26	2	42	190,412	1,744	1,766	2	0	0	11	13	58	0	7	274	339
West (Dist. 7-C & 8)	56	46	0	10	258,495	1,278	1,031	2	0	0	6	8	18	0	3	97	118
Panhandle (Dist. 10)	10	7	0	3	33,896	259	204	0	0	0	1	1	1	0	1	5	7
Eastern (Dist. 5 & 6)	8	3	2	3	41,874	302	430	0	0	1	2	3	4	0	4	66	74
Gulf Coast (Dist. 3)	33	23	0	10	199,446	943	1,055	3	1	0	3	7	46	24	24	165	259
Southwest (Dist. 1, 2 & 4)	26	14	2	10	116,795	844	361	2	0	0	6	8	49	8	17	194	268
Louisiana	34	23	3	8	154,343	818	803	1	0	0	5	6	22	12	9	118	161
Northern	25	14	3	8	78,530	457	440	0	0	0	5	5	3	1	3	69	76
Southern	9	9	0	0	75,813	361	362	1	0	0	0	1	19	11	6	49	85
Arkansas	7	3	0	4	32,844	158	109	0	0	0	1	1	1	0	0	30	31
Mississippi	14	9	1	4	114,937	291	149	0	0	0	4	4	0	0	1	57	58
Southeastern States	3	0	0	3	13,219	34	27	0	0	0	3	3	0	0	0	30	30
Montana	9	3	4	2	17,735	156	185	0	0	1	0	1	2	0	5	14	21
Wyoming	6	4	0	2	22,067	133	101	0	0	0	2	2	7	0	2	20	29
Colorado-Utah	6	3	0	3	27,127	119	85	1	0	0	3	4	2	0	1	33	36
New Mexico	16	15	0	1	68,180	316	219	0	0	0	0	0	4	0	1	21	26
California	31	25	0	6	112,044	1,183	1,076	1	0	0	4	5	32	0	5	173	210
Total United States	781	411	72	298	2,510,793	18,948	17,203	24	1	5	95	125	404	47	124	2,346	2,921
Total previous week	780	392	112	276	2,560,088	18,167	16,656	16	2	8	87	113	380	46	119	2,251	2,796
Total August 10, 1946	547	299	50	198	1,900,291			14	2	5	68	89	312	27	75	1,999	2,413

Service wells included: *19, †24, ‡1.

CRUDE PRICES AND REFINERY ACTIVITY

GRAVITY SCHEDULES

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity—	Signal Hill, Calif.*	Oklahoma, Kansas	Gulf Coast Tex.†	West Tex.‡
18-18.9	$1.60	....	....	....
19-19.9	1.65	....	....	....
20-20.9	1.69	$1.55	....	$1.42
21-21.9	1.73	1.57	....	1.44
22-22.9	1.77	1.59	....	1.46
23-23.9	1.80	1.61	....	1.48
24-24.9	1.84	1.63	$1.86	1.50
25-25.9	1.88	1.65	1.88	1.52
26-26.9	1.91	1.67	1.90	1.54
27-27.9	1.95	1.69	1.92	1.56
28-28.9	1.99	1.71	1.94	1.58
29-29.9	2.02	1.73	1.96	1.60
30-30.9	2.06	1.75	1.98	1.62
31-31.9	....	1.[illegible]	2.00	1.64
32-32.9	....	1.79	2.02	1.66
33-33.9	....	1.81	2.04	1.68
34-34.9	....	1.83	2.06	1.70
35-35.9	....	1.85	2.08	1.72
36-36.9	....	1.87	2.10	1.74
37-37.9	....	1.89	2.12	1.76
38-38.9	....	1.91	2.14	1.78
39-39.9	....	1.93	2.16	1.80
40 and above	....	1.95	2.18	1.82

*Standard Oil Co. of Calif. posting. †For crude from Daboval, El Campo, and Sandy Point. ‡Includes Lea County, New Mexico.

A.P.I. REFINERY REPORT, WEEK ENDED AUGUST 2

(Thousands of barrels)

District—	Crude runs, daily avg.	Production				Stocks at refineries, bulk terminals, in transit and in pipe lines			
		Gasoline†	Kerosine	Gas & dist. oil	Residual	Gasoline*	Kerosine	Gas & dist. oil	Residual
East Coast	887	2,391	363	1,230	1,665	20,778	7,953	13,760	9,950
Appalachian:									
District 1	96	300	28	93	110	2,176	240	508	314
District 2	58	258	16	40	114	847	188	142	124
Ind., Ill., Ky.	878	3,082	345	860	1,063	15,378	2,209	5,185	4,177
Okla., Kans., Mo.	428	1,512	142	529	463	6,787	940	2,478	1,258
Inland Texas	234	1,057	80	140	416	3,151	425	468	830
Texas Gulf Coast	1,252	3,730	556	1,581	1,766	12,623	2,662	8,461	6,372
La. Gulf Coast	413	1,264	375	521	493	4,462	1,697	2,538	1,714
N. La. and Ark.	65	164	44	69	95	1,638	327	345	122
Rocky Mountain:									
New Mexico	9	33	3	9	17	86	11	30	32
Other Rocky Mtn.	137	429	11	142	212	2,521	141	775	724
California	814	2,297	80	790	2,168	15,198	872	13,639	27,490
August 2, 1947	5,271	16,517	2,043	6,004	8,582	85,645	17,665	48,329	53,107
July 26, 1947	5,162	16,142	1,884	5,708	8,738	85,812	16,807	47,097	52,497
August 3, 1946	4,836	15,156	1,672	5,514	8,120	87,217	16,490	46,797	50,561

*Finished and unfinished. †At refineries including natural blended.

Bureau of Mines crude-oil stocks 231,357,000 bbl. as of July 26—down 45,000 bbl. One year ago 223,756,000 bbl.

FLAT CRUDE PRICES

Representative posted schedules per bbl.

East Texas	$1.95
Kettleman Hills, California*	2.14
Beauregard Parish	1.90
Illinois Basin	2.07
Pecos County, Texas (Yates)	1.85
Bradford, Pennsylvania	4.30
Eastern Ill. and Western Ind.†	2.07
Tomball, Texas Gulf Coast	2.10

*37°-37.9°. †35° and above.

TRENDS

DAILY AVERAGE PRODUCTION FOR WEEK

	Aug. 9 crude oil	B. of M. Aug. demand	Aug. 2 crude oil
Alabama	1,200	1,200	1,200
Arkansas	82,100	81,000	81,150
California	920,800	920,000	921,000
Colorado	40,370	43,000	41,390
Eastern	66,800	65,400	65,000
Florida	1,000	800	1,000
Illinois	177,300	200,000	179,400
Indiana	17,800	18,000	17,700
Kansas	283,100	305,000	292,750
Kentucky	25,600	27,000	26,050
Louisiana	435,950	437,000	430,975
North Louisiana	105,900	.....	104,850
South Louisiana	330,050	.....	326,125
Michigan	41,915	45,000	40,030
Mississippi	99,955	96,000	97,410
Montana	22,950	24,000	23,860
Nebraska	500	600	550
New Mexico	107,950	106,000	108,100
Oklahoma	388,550	405,000	385,400
Texas	2,283,500	2,255,000	2,263,675
Dist. 1 (Southwest)	23,430	.....	22,400
Dist. 2 (Southwest)	157,895	.....	144,675
Dist. 3 (Gulf Coast)	484,730	.....	486,450
Dist. 4 (Southwest)	235,800	.....	217,100
Dist. 5 (Eastern)	39,480	.....	39,250
Dist. 6 (Eastern)	113,825	.....	113,025
East Texas Field	324,000	.....	324,000
Dist. 7-C (West)	39,375	.....	39,250
Dist. 8 (West)	617,075	.....	631,475
Dist. 7-B (W. Central)	39,000	.....	37,650
Dist. 9 (N. Central)	125,850	.....	124,525
Dist. 10 (Panhandle)	83,040	.....	83,875
Wyoming	116,300	122,000	118,575
Miscellaneous	.....	.....	.....
Total United States	*5,113,640	5,152,000	5,095,215

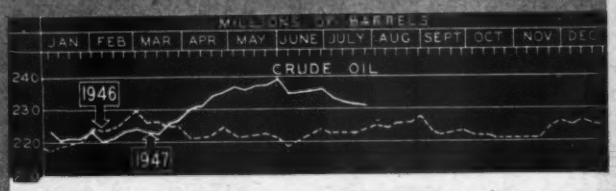
Change from prev. wk., up 18,425

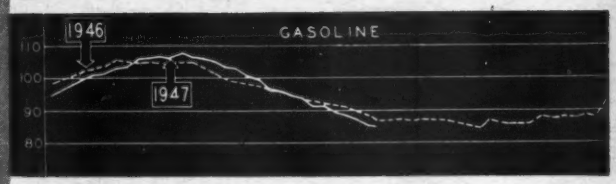
Total production January 1-August 9.... †1,094,632,855 bbl.

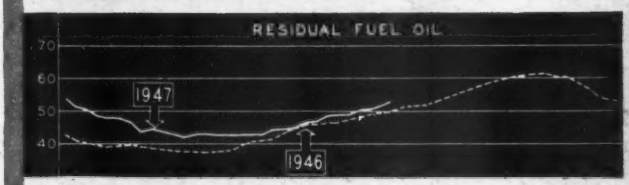
Same period last year (crude plus cond.) 1,043,755,179 bbl.

*Not incl. 41,165 bbl. condensate. †Incl. 6,583,075 bbl. condensate.

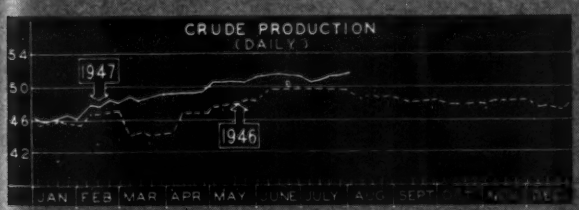
OIL STOCKS IN THE UNITED STATES

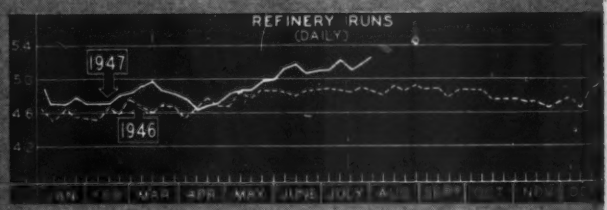






DAILY OPERATIONS





Solid line charts weekly completions, service wells in Eastern area included.

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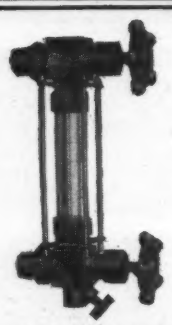

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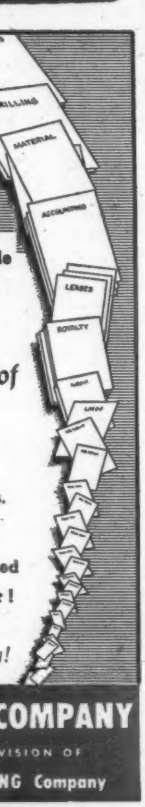

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MARKETS

THE petroleum-products spot market had almost ceased to exist in the Mid-Continent area and along the Gulf Coast this week as nearly all products were reported in their shortest supply to date. Most of the activity was confined to swapping of products as refiners and suppliers tried to improve their storage position on their most needed materials.

In the Mid-Continent, one independent refiner said the market "which once had no bottom" today has no top "for the man who has something to sell." Another said the whole problem of buying anything "depends on who you are," adding that "only regular customers are able to buy anything.

Refiners were reported watching jobbers closely to make certain supplies were actually needed before permitting sales to them. No. 2 fuel oil was among the tightest of products, with quotations as high as 7⅞ cents heard.

Fuel Oil 'Off'

The fuel-oil market was reported in a "lull," with fewer inquiries than has been the case in recent weeks. Price, however, was no lower and suppliers were expecting an increase in activity next month.

Although practically no gasoline was moving, quotations ranged as high as 10⅝ for the second week and reports of offers of 8 cents for kerosine also were heard.

Talk of a crude-oil advance, strong several weeks ago but considerably lessened by the hold-the-line statement of Eugene Holman, president of Standard Oil Co. of New Jersey, again was in evidence. Guesses ranged from the near future to 90 days.

Along the Gulf Coast practically nothing was moving on the spot market and observers predicted the situation would remain unchanged until September 15 or later. In the meantime, one large supplier suggested, there will be nothing but tradeouts where refiners "are long on one product and short on another."

Increase Expected

Everybody with storage space was reported trying to fill with kerosine and light burning oils, anticipating higher prices with the approach of cooler weather. Gasoline, both regular and premium, was reported unavailable.

Lubricating oils were reported unchanged, with products still available and the prices unchanged, although there still was considerable speculation of impending increases.

In North Texas one shipment of premium gasoline was moved at 10⅜ cents. Other products remained scarce with very little activity.

Highest price reported recently for heavy fuel oil was that of cargoes of Bunker C moved on the Gulf Coast at $2.75.

Throughout the market generally, the leveling off of the upward trend of products, forecast by many observers in recent weeks, failed to materialize.

The tight holding of light burning oils and kerosine by suppliers, trying to increase storage of the products expected to be in strong demand soon, indicated that many refiners and suppliers expect prices in those products to increase still further. All were in agreement that there will be no downward movement of any consequence in prices in the near future.

Representative Quotations

Representative spot-market quotations of leading suppliers as of August 11, 1947. Figures are f.o.b. plant for tank-car shipment in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor	Texas Gulf Coast
Regular gasoline, 73-75 octane	8.5-9.25	10.3-10.5* 9.3-9.5†	9-10
Premium gasoline 78-80 octane	9.25-10	10.2-12	9.5-10.5
42-44 w.w. kerosine	7.5-7.75	7.8-8.1	7.5-8
No. 2 straw fuel oil	7-7.625	6.8-7.2	7-7.5
No. 6 residual	$2.15-2.50	$2.22-2.52	$2.00-2.75

*Branded (74-76 octane); †Unbranded (74-76 octane).

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	5.875	5.375	5.625
Grade 18-55	7.05	6.45	6.75

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	11.5-12.5
750 vis., No. 3-4 neutral	13.5-15.25
2,000 No. 5-6 neutral	15-16.75

LUBRICATING OILS

Mid-Continent

150-160 vis. D bright stock, 0-10 p.p.	29
200 vis. No. 3 neutral, 0-10 p.p.	18-19

Western Pennsylvania

145-155 vis. 10 p.t. bright stock	45
180 vis. 0 p.t. neutral	43

CRUDE-SCALE WAX

Mid-Continent

130-132 A.S.T.M. melting point	6.75-7.75

EQUIPMENT MEN ... in the News

Gulick President of International Goodrich

W. C. GULICK

Willard C. Gulick has been named president of International B. F. Goodrich Co. Gulick, who has been general sales manager of the company's export division, succeeds Stanley W. Caywood, who retired recently for reasons of health. The new executive represented the company overseas for 12 years before the outbreak of World War II and is well known to world export circles.

Coffin Named for Akron Position

Larry H. Coffin has returned to Akron as assistant to George K. Hinshaw, vice president and production manager of Goodyear Tire & Rubber Co.'s foreign operations. Coffin has been plant manager of the company's tire, textile, and mechanical goods operations in Sao Paulo, Brazil, since 1942. Marvin A. Ryan, who has been in charge of Goodyear's Cuba plant, succeeds Coffin as plant manager in Brazil. Three other men who hold foreign posts are in Akron on regular home leaves. They are: M. S. Meyer, who since 1944 has been managing director of operations in India; W. J. Condon, plant manager at Sydney, Australia, who has spent 20 years overseas for the company; and Reardon West, production superintendent of tires at the Argentina factory.

Boyer Announces Diesel Improvement

Reduction by as much as 72 per cent in the fuel cost of engines burning diesel oil and natural gas has been announced by Ralph L. Boyer, vice president and chief engineer of the Cooper-Bessemer Corp. Percentage of savings possible with the new development ranges from 10 to 72 per cent under current costs, depending upon the type of equipment now in use, Boyer said, and in any case, offers substantial fuel economy to all users of gas-diesels compared to straight oil-burning diesels and spark-ignited natural-gas engines.

Results achieved by Cooper-Bessemer engineers have been compiled on a 1,440-hp. gas-diesel installation operating a municipal power plant at Cherokee, Okla., following extensive tests at the company's two plants at Mount Vernon and Grove City, Pa.

The Cherokee unit is the first commercial engine of the new type to be installed. It is currently saving that community $33,214 a year compared with the fuel cost of a diesel oil-burning engine; is $1,394 cheaper to operate than original gas-diesels; and is $3,174 cheaper to operate than a spark-ignited gas engine. Cooper-Bessemer has applied for patents on the new development and is therefore not ready to reveal how this new fuel economy has been reached, Mr. Boyer said.

Rent-a-Plane Co. Established in Tulsa

New four-place Beechcraft Bonanzas are available on a rental basis through the recently established Rent-a-Plane Co. at Tulsa Municipal airport, it is announced by Ralph D. Smith, general manager of the air firm. With the Bonanzas equipped for night and instrument flight, the company offers a combination rental, charter, ambulance, and sight-seeing service. "Making our planes available in this manner allows the business man who flies himself, or who has an employe who flies, to effect a considerable saving in air travel," Smith stated. Before coming to Tulsa, Smith had been employed by Beech Aircraft Corp., Wichita, where he was head of the advertising section of the public relations department and also served as a service test pilot in the testing program of the new Bonanza. He has flown this newest model Beechcraft more than 300 hours under all kinds of flight conditions and weather.

Globe Steel Appoints Scott

John F. Scott has been appointed chemical and metallurgical sales representative of the New York district office of Globe Steel Tubes Co. Scott has been assigned to the staff of R. R. Lally, vice president in charge of the New York office, located in the Lincoln Building. He joined Globe Steel Tubes Co. in 1940 as metallurgist in the laboratories located at Milwaukee, and early in 1947 was transferred to the Milwaukee general sales office as chemical and metallurgical sales representative.

Western Supply Represents Santa Fe

E. B. ANDERSON

Western Supply Co., Tulsa, has been appointed exclusive Mid-Continent representative for Santa Fe Tank & Tower Co., Los Angeles. Western Supply will handle the distribution of Santa Fe Tank & Tower's complete line of cooling towers, both mechanical and atmospheric, and the air-cooled units. E. B. Anderson has been appointed sales engineer to assist both Western Supply and Santa Fe in the distribution of cooling towers and rating of air-cooled units. In addition to his work with cooling equipment, Anderson will assist Western's chief engineer, James E. Hughes, in the sale and engineering of the company's own patented heat-transfer equipment, including all types of shell-and-tube exchangers, atmospheric and submerged sections, and other oil-country equipment.

Sterling Engine Elects Porteus

J. B. PORTEUS

At a meeting of the board of directors of Sterling Engine Co., Buffalo, James B. Porteus, of Bronxville, N. Y., was elected to the board and named president of the firm. Porteus, who succeeds the resigning president, Addison F. Vars, was formerly with Westinghouse Electric International Co., in charge of distribution in Brazil and subsequently in North Latin America. George M. Ebert continues as executive vice president and comptroller.

Classified Advertising

The Market Place for the Oil Industry

EQUIPMENT FOR SALE

FOR SALE: Six New Kobe. 2½ inch tubing insert, pumps, one Triplex—Bargain for immediate sale. Ben Beckham, Jr., Box 134, Overton, Texas. Phone 3921.

FOR SALE: Shaffer power draw works, powered by two J. L. 1335 Buda engines compounded. Suitable for 5,000 foot work. In A-1 condition. Price $7,500. Terms. Melton Well Service, Box 1360, Seminole, Oklahoma.

FOR SALE: 2—NO. 2 NATIONAL Drilling Machines complete with all tools and equipped with Young Engines, 150 and 175 HP. Fine condition. Accessible for immediate inspection. Contact T. M. Cooper, Ph. 2-6758 after 5 p. m., Tulsa, Okla.

FOR SALE: 4 six cylinder 60 hp. Waukesha Power units with clutch and three-speed transmission. Starter and generator. Now connected to light high speed winch but could be used for direct power or right angle drive and still have winch. Price $800 each. P. O. Box 4313, Memphis, Tenn.

1 STAR 45 ST Spudder with Hercules engine. Both in excellent condition. No tools. Located 10 miles East of Drumright. Okla. 1 Ft. Worth Super D Spudder with practically two strings of tools, located on Lysite Mountain, Wyoming. Travco Equipment Company, 110 Midco Bldg., Tulsa, Oklahoma. Phone 5-2251.

NEW BOLTED TANKS

15—100 Bbl. Bolted Steel Tanks.

15—250 Bbbl. Bolted Steel Tanks.

15—200 Bbl. High, Bolted Steel Tanks.

15—500 Bbl. Low, Bolted Steel Tanks.

17—1,000 Bbl. High, Bolted Steel Tanks.

All above tanks new, crated for export, with all hardware, gaskets, ladders, etc.

PETROLEUM EQUIPMENT, INC.
P. O. Box 887 Telephone 2-6291
Tulsa, Oklahoma

STEEL TANKS

9—883,000 gal., 55 ft. dia. x 50 ft. high 29/32 in. thick, cone bottom. Can be supplied with or without 6-compartment Dorr thickener mechanisms.

6—160,000 gal., 35 ft. dia. x 21 ft. high welded, cone bottom, ⅝ in. walls Can be furnished with or without Dorr thickener mechanisms.

1—450,000 gal., 50 ft. dia. x 30 ft. high, ⅝ in. walls.

4—106,000 gal., 30 ft. dia. x 20 ft. high.

1—16,200 gal. 10 ft. dia. x 27 ft. long, horizontal lead lined. Can be used for acid storage.

All of these tanks are UNUSED. Installed new in 1944 in a War Plant. Location: Mobile, Ala. Immediate Shipment.

WIRE, PHONE or WRITE
For details and prices

CONSOLIDATED PRODUCTS CO., INC.
17-20 Park Row, New York 7, N. Y.
Telephone: BArclay 7-0600

EQUIPMENT FOR SALE

3500 BBL. REFINERY, topping and cracking, also 40,000 bbls. heavy steel storage. One Ingersoll-Rand XOG #10 compressor with starting motor. Two Cooper-Bessemer 80 H.P. Engines with starting motor. Write Box 271, Tyler, Texas.

FOR SALE

50—Used Model W-25 Allis-Chalmers gas engines complete with combination carburetor, radiator, dutch power take-off with V-Belt sheave, protective controls, and hand starting crank. All were in good operating condition when removed. Will sell single engines or in lots.

GLENN SUPPLY COMPANY
P.O. Box 1104 Tulsa, Okla.
Phone 3-9607

FOR SALE

1—Ajax valveless 16 x 16 type OS engine.

3—40 hp. 2-cycle EC enclosed type Bessemer gas engines with 12 x 18 cylinders.

6—25 hp. Superior engines, 4 cycle type OC.

3—30 hp. OCS vat transmission unit.

BANKOFF PIPE & SUPPLY COMPANY
823 N. Lewis
Tulsa, Oklahoma

FOR SALE
STEEL STORAGE TANKS

18—10,000 Gallon Capacity Tank Car Tanks

CLEANED PAINTED TESTED
Located in Oklahoma

IRON & STEEL PRODUCTS, INC.
42 years' experience
13412 S. Brainard Avenue
Chicago 33, Illinois. PHONE BAYport 3456
"ANYTHING containing IRON or STEEL"

EQUIPMENT FOR SALE

WELL DRILLING Machines, Spudders, Standard Outfits. Complete stock cable tools Used equipment reconditioned. Some Government surplus. Pressey & Son, Pueblo, Colorado.

FOR SALE

Approximately 18,000 ft. of 14" OD spiral weld line pipe located near Fittstown, Okla. Call or wire

MORAN PIPE & SUPPLY COMPANY
804 Ritz Bldg. Ph. 3-3595
Tulsa, Oklahoma

NEW PUMPS FOR SALE

New Gaso Fig. #1860—4½" x 6" with engines—3"—2 Stage Byron Jackson with and less engines—Hale Chrysler Fire Pumps with engines—Aurora Model AD2 with engines—Lombard Fig. #1684 with engines—Novo Model KH2 with engines.

Write for Specifications and Prices

H. A. McCARTHY
310 Thompson Bldg. Phone 5-3296
Tulsa, Oklahoma

SPECIAL OFFERING—PUMPS

3—"Barnes" 3" centrifugal self-priming pumps, Model 20M, each has capacity of 325 GPM of water developing 25 ft. total head including 10 ft. suction lift. Driven by direct connected Wisconsin air-cooled, single cylinder, four cycle, gasoline engine, Model AHH. Speed 2200 RPM Brake H.P. at rated capacity and head is 7.5. Pump is bronze fitted and has a stainless shaft sleeve. Unused and export crated. Complete. Each pump having set spare parts. Mounted on steel wheels.

PETROLEUM EQUIPMENT, INC.
P. O. Box 887 Telephone 2-6291
Tulsa, Oklahoma

SHOT HOLE DRILLS

Large and Small

All are truck mounted, rotary, chain pull down, smallest pump size 4 x 6. Some are in excellent condition; others need repair. Price F.O.B. Dallas, from $3,000 to $8,000, including truck.

For details write

8800 LEMMON AVENUE, DALLAS, TEX.

NEW TANK TRAILERS

2,000 Gallon Capacity
2-Compartment

With gasoline powered pump, discharge hose, squeeze nozzle, 9.00 x 20 dual rear pneumatics, air brakes, landing gear, with or without front dolly.

Also

New 1350-gallon, 2-compartment truck tanks on 6x6 G.M.C. chassis complete with hand or power pumping equipment, etc.

L. B. SMITH, INC.
Camp Hill, Pa. Phone Harrisburg 7331

EQUIPMENT FOR SALE

FAILING 314C DRILL—Fully equipped, $13,600. W. D. Glenn, Box 428, Aurora, Colorado.

CULVERTS For Sale: 18" corrugated galvanized, sectional culverts. Will make any desired length and sustain heavy loads. Phone 3-9169, Tulsa, Oklahoma.

30,500 ft. new seamless steel tubing, cold drawn, 1020 size 2.432 x .4225 wall, 12' to 19' Random Lengths. $75.00 net ton FOB Linden, New Jersey. Also approximately 250 ton misc. tubing sizes 1" to 7⅛" smaller sizes light wall larger sizes .220 to 25/32" wall. Write for complete description. $70.00 ton FOB Ohio. South Texas Pipe & Supply Company, Box 3188. Corpus Christi, Texas.

BOILER FEED PUMPS

2—Worthington, duplex, steam pumps, 14" x 8½" x 15". Outside center packed plunger type with pot valves, piston steam valves, bronze rods, etc. Reconditioned and guaranteed.

PETROLEUM EQUIPMENT, INC.
P. O. Box 887 Telephone 2-6291
Tulsa, Oklahoma

EQUIPMENT FOR SALE

FOR SALE: 10,000 sq. ft. steel airplane landing mat, 15" x 10' Sections. Will make into portable all-weather lease road for hauling equipment, etc. 10c per sq. ft.. F.O.B. Tulsa, Oklahoma. Subject to prior sale or withdrawal. Also have several light plants at bargain rates. Marshall Travis, 110 Midco Bldg., Tulsa, Oklahoma. Phone 5-2251.

FAILING DRILL RIG (1500) mounted on 2½ ton GMC Truck, 1000 ft. cable, bits and subs, like new, $10,500.00. First Investment Company, Englewood, Colorado.

FOR SALE: Steel Sub-Structure 10' high by 24' square. Ideal for water locations. Located K M A Field, Wichita County, Texas. Box B-849, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: Ingersoll-Rand Imperial Type 10, 2 stage belt-driven compressor with 110 hp. twin cylinder Bessemer gas engine with 20' x 54' wood frame galvanized iron building, 4 scrubber tanks, circulating coils with heavy welded tank 10' x 24' x 10" deep, air compressor with volume tank complete. Phone or write W. R. Bowman, 214 Kennedy Bldg., Tulsa, Oklahoma. Phone 2-2633 or 6-6960.

EQUIPMENT FOR SALE

NEW LUBRICATED PLUG VALVES

57—1¼" Merco Nordstrom Valves, Fig. #142
143—1½" Merco Nordstrom Valves, Fig. #142
3—1½" Merco Nordstrom Valves, Fig. #143
162—1½" Merco Nordstrom Valves, Fig. #115
242—2" Merco Nordstrom Valves, Fig. # 143.

PETROLEUM EQUIPMENT, INC.
P. O. Box 887 Telephone 2-6291
Tulsa, Oklahoma

FOR SALE

8—New 500 gal. Water Storage Tanks (51⅝" x 38⅜" oval shape) 74" long, 3/16-in. thick, skid mounted, clean-out openings, baffled for non-splash. $81.25 each.

2,200—feet 4½" OD plain end Seamless extra heavy steel tubing 18 ft. to 30 ft. long—$1.40 per ft.

100—tons 1¼" Sq. Reinforcing Bars 20 to 30 ft. long, new mild steel. $91.15 per ton.

29—tons 1" Round New Mild Steel Reinforcing Rods, 30 ft. long. $95.35 per ton.

150—Rolls Reinforcing Wire, 3" by 3"-x 5 ga. (¼") 87" wide by 87" wide x 77 ft. long. $29.90 per roll.

9,100—Ft. New 18" 16 ga. Galvanized Corrugated Nestable Culvert Pipe. 91c ft.

7—Gorman-Rupp Centrifugal Pumps, skid mounted, 200 g.p.m., 350 ft. head, 6 cylinder, Chrysler water-cooled engine, complete with spare parts, crated in one box—just reduced to $659.50 each.

ST. LOUIS BOILER & EQUIPMENT CO.

721 Olive Street

Chestnut 1652 St. Louis 1. Mo. L. D. 548

TWO DRILLING RIGS FOR IMMEDIATE SALE

1.—A Wilson Titan drilling rig (Cummings 600 diesels) complete with 30' x 30' x 136' derrick; 12,700' of 4½" drill pipe; 8 x 16 Emsco C-16 mud pump with stand-by unit; and all auxiliaries. New in January of 1946. Has drilled only 15,000 feet. Located shipside, Dominican Republic. Immediately available.

2.—Ideal Model 5C-3, rotary steam drilling rig; complete with twin cylinder Ideal 9 x 8 engine; 4945' of 4½" drill pipe; 24' x 24' x 122' Lee C. Moore derrick. Located shipside, Dominican Republic. Immediately available. Attractively priced.

Write, Phone, or Wire

CIA SEABOARD DOMINICAN DE PETROLEO
30 Rockefeller Plaza Room 2437
New York City, N. Y.

PIPE FOR SALE

Approx. 2,000' ..... 10¾" O.D.
Approx. 2,000' ..... 8⅝" O.D.
Approx. 1,500' ..... 7" O.D.
Approx. 5,000' ..... 2" Line Pipe
1 Band Wheel Power and Power House.

Above located 2 miles South and 1 mile West of Oilton, Okla., on our Sarah Rector lease. Subject to prior sale.

WESTERN PIPE & EQUIPMENT COMPANY

922 Neil P. Anderson Bldg.
Phone 2-5668, Fort Worth, Texas

PARTS FOR ARMY TRUCKS

New and Used

Largest stock in America, 6x6, 6x4, 4x4, 4x2. All items guaranteed. Largest auto wrecking house in the west with most complete stock of new and reconditioned parts for all cars and trucks. Fast service.

PIONEER AUTO WRECKING CO.
752 W. 13th Ave. Denver 17, Colo.

LIQUIDATING
WATER FLOOD PROJECT

Formerly Shell Oil Co. Lease
(Approx. one mile west of Bronson, Kansas on Highway 54)

Rare Opportunity to Purchase

- 4" & 6" Duroline Pipe
- 1 Oil Well No. 30SC enclosed Gear Power. Oil Bath Type
- Electric Motors, Single to 3 phase. ½ to 100 H.P.
- Worthington Triplex Pump, 7 x 12, Completely Overhauled
- 1 Portable International Pulling Machine Complete with pole, for Shallow Wells
- 1—5½ Keystone Drilling Machine on pneumatic dual tires
- Centrifugal Pumps
- Welded Steel & Wood Storage Tanks
- Water Treating Equipment
- Pipe, Valves, Fittings, Sucker Rods, & etc.

Contact Mr. Campbell Berry on the Lease Site
or
Write Wire Phone

K. B. Oil & Gas Company

P. O. Box 78
Kansas City, Mo.

EQUIPMENT FOR SALE

FOR SALE: Model K Cardwell, perfect condition w/5" & 7" tools complete. Morris & Son, Box 107, Carmi, Illinois.

FOR SALE: 10—5 K.W. Onan Electric Generating Units powered by 17 h.p. 4 cylinder, radiator cooled, Red Seal Continental Motor. These are Army Surplus, new and unused. $595.00 each f.o.b. Huntington, W. Va. Branchland Pipe & Supply Company, Huntington, West Virginia.

FOR SALE: 6000 Ft. 6⅝" O.D. 13# Lapweld Plain End Cement Lined Second-Hand Line Pipe, 80 cents Ft. F.O.B. Fittstown, Oklahoma. The National Supply Company, 504 East Archer, Tulsa 3, Oklahoma. Phone 2-8101.

16 JOINTS (Approx. 500') 2⅞" OD Drill Pipe 30' Lengths with Hydril Joints, New, never run, at $1.50 per ft. 1—Model 200 Oilwell 5 Sheave Crown Block, 200 Ton Capacity, practically new, $450.00. H. W. Beck, Box 403, Phone #89, Grayville, Ill.

FOR SALE: Model 55 Wichita Spudder less mast with PA-100 International engine in good condition. Located close to Pampa, Texas. Nabob Oil & Gas Company, Box 448, Amarillo, Texas.

FOR SALE: Fort Worth Spudder complete—nothing to buy to drill to 3200 feet. Write for full description of this machine. Many extras. $10,000. Midland Oil Corporation, 253 Nacol Building, Wichita Falls, Texas.

WE BUY and SELL

Steel Pipe and Tubing
Pipe Fittings—Well Casing
Culverts and Valves

SONKEN-GALAMBA CORP.

2nd & Riverview, Kansas City 18, Kans.

HYDRAULIC PUMPS

Aldrich Pump Co. Vertical Triplex HYDRAULIC PUMPS, 2¾" x 8", equipped with Herringbone gears, 67.5 GPM. Maximum pressure for intermittent duty 2,200 lbs., for continuous duty 1,800 lbs. Pump and motor mounted on common bed plate.

Motors are 75 HP, 3/60/220-440 volts, 1740 RPM. Complete with starting panel, consisting of G.E. motor starter switch, push button control, square "D" Switch, and capacitator.

Purchased new 3½ years ago. Excellent condition. Available for immediate delivery.

CONSOLIDATED PRODUCTS CO., INC.

17-20 Park Row, New York, N. Y.

FOR SALE

LUBRICATING OIL FOR SALE

A.P.I. 25.0—28.5
VISCOSITY at 100' 200'—500'
POUR POINT —30' —50' F. Below Zero

MUENSTER'S REFINERY, INC.
Muenster, Texas

EQUIPMENT WANTED

WANTED: TWO SHELL stills, ten or twelve feet in diameter by 30 feet long. Write Box B-853, The Oil and Gas Journal, Tulsa, Oklahoma, giving full particulars, including price.

WANTED

STEEL STORAGE TANKS

500 to 75,000 Barrel Capacity
Any Type

MAIL—WIRE—or PHONE
Your Offering

IRON & STEEL PRODUCTS, Inc.

42 years' experience

13412 S. Brainard Ave., Chicago 33, Ill.

"ANYTHING containing IRON or STEEL"

IS YOUR COMPANY FOR SALE?

Wanted to buy small local manufacturing company which supplies equipment to petroleum industry. Desirable that company's products and manufacturing ability are already proved. Buyer not interested in inventions or new developments not in production. Write us giving type of product you manufacture, plant size and general location and approximate asking price.

Box B-824,

The Oil and Gas Journal,
Tulsa, Oklahoma

HELP WANTED

WANTED: Refinery Superintendent capable of efficiently handling complete refinery operation. Must be capable personnel man and have technical as well as practical knowledge of asphalt plant operation. Excellent opportunity for qualified man with progressive independent company. Advise age, experience, references, and other necessary information in first letter. (Snapshot if available). Box B-835, The Oil and Gas Journal, Tulsa, Oklahoma.

SEVERAL GEOLOGISTS UNDER 30. M.S. Degrees preferred. Or B.S. Degrees with few years' experience. Good jobs. No fees. Oil Industry Employment Service, P. O. Box 2603. Tulsa, Oklahoma.

WANTED

Distributor for Southwest Oil Field

Large, well-known, long-established manufacturer of engine-driven lighting and generator plants seeks aggressive distributor well acquainted in the Southwestern oil fields. Line includes capacities from 250 to 25,000 watts.

Man we seek should know oil well supply houses as well as oil companies. Attractive, money-making opportunity Write, giving full qualifications.

Address Box B-850
THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

HELP WANTED

EXECUTIVE ASSISTANT with varied experience in oil production, pipe line, refining, and marketing, particularly crude oil purchases and sales. Some refined products sales experience helpful. Independent oil company. Box B-840. The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED DRILLER, to take charge of drilling two shallow gas pools, laying lines, etc. Box 435, Lawrence, Kansas.

GEOLOGIST, under forty, to serve as District Geologist for South Arkansas. Must have at least five years experience; three years in subsurface work, with some experience in Ark-La-Tex area. Give all information concerning experience and training in reply. Also minimum salary expected. Box B-837, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM GEOLOGIST, AGE 25-30 YRS., 2-3 yrs. experience subsurface and well sitting, geological evaluations, ability to do surface work. Rocky Mtn. Area, salary dependent upon experience, give full particulars in application. Box B-858, The Oil and Gas Journal, Tulsa, Oklahoma.

CHEMIST or Chemical Engineer with experience to take charge of refinery control laboratory. Old established Major in Chicago area. Applicant must have supervisory ability. Send complete details of education and experience. Box B-847, The Oil and Gas Journal, Tulsa, Oklahoma.

JUNIOR ENGINEER NEEDED for West Texas refinery. Require engineering graduate, preferably in Chemical, Petroleum, or Mechanical Engineering. Duties include plant tests, inspection of equipment, and assistance on designs and specifications. Will be given opportunity for supervised training in all phases of refinery operations. Prior professional or refinery experience not essential. An opportunity for a practical-minded young engineering graduate. Box B-862, The Oil and Gas Journal, Tulsa, Oklahoma.

DEVELOPMENT GEOLOGIST: Age 25-30. M.S. degree Geology. Above average academic background. 2-3 years' experience preferable. Application must state complete qualifications and references. The California Company, 1818 Canal Building, New Orleans 12, Louisiana.

HELP WANTED

A stillman for skimming unit. Excellent opportunity for advancement. Newly erected plant located Albany, Kentucky. Write, phone or wire. Atomic Producing & Refining Company, Albany, Kentucky.

COLLEGE GRADUATES WANTED

for work in Saudi Arabia

Geologists
Paleontologists
Petroleum Engineers
Safety Engineers

Send full particulars and transcript of college record to—

ARABIAN AMERICAN OIL COMPANY
200 Bush Street—Room 615
San Francisco 4, California

GEOLOGIST

Independent with substantial reserves operating in Mid-Continent and Gulf Coast areas wants competent Geologist with major company experience to become connected with aggressive organization seeking additional production. Please state age and full details of education and experience. Excellent salary for right man. Location, Tulsa. Replies confidential.

Box B-844

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Tulsa, Oklahoma